

August 1991

Vol. 4 Nº 11

Price £2.00

Archive

The Subscription Magazine for Archimedes Users

Audio Data Compression

Using a Second Floppy Drive

In Search of Euler's Constant

Reviews: Chocks Away Extra Missions, Tracer, Chess, Chess 3D, Archimedes for the Anxious, ScanLight Junior 256, PRES interface & DFS, Eizo 9080i Monitor, Iron Lord, PenDown Fonts, ArcTerm 7, Pilling Terminals, Fine Racer, Conform, ArcLight, Solids Render, ViewPoints, Key Plus, Freddy Teddy's Adventure

Thanks again!

Here's a typical example of the "spirit of Archive" – I mentioned last month that I was going off to the States for three weeks and asked if people would send articles in early. Within days of the magazine going out, I was deluged with articles. Many thanks! I'm just sorry that they won't all be published this month – after the special effort you have made. Still, when I get back, I'm going to have to produce the September issue fairly quickly (though it may be a little late) so it's great having extra articles ready to "paste in". Thanks again for all your help and interest in Archive.

Cheaper Removable Drives!!??!!??

Each month, or at least every other month, I seem to be saying that the price of the 42M removable drives has dropped again. Last month, I foolishly said I didn't think they would be dropping again for a while. Well, I think I've found another supply of these drives – which could involve another price drop. So, if you're thinking of buying a removable drive, hold off for a few days and give me a ring – I should be back in the Archive office on Friday 16th August.

We have moved!

No, don't get too excited, we're not moving again. It's just that some people are *still* sending letters and orders to 18 Mile End Road which we left in November last year! It's usually "the computer's fault" because it prints out the address label the way it has always done. Please tell your computers we have moved! Thanks.

Bye for now,

Paul B.

And now a word from our Sponsor....

If you ask a committed Christian what it was that first attracted him or her to the Christian faith, I think you will find that the vast majority will say something like... "Well, I knew some Christians and was impressed by their attitude and life style and so I decided to look into it." That's certainly what started me on my search for the truth back in the mid 1960's.

On the other hand, if you find someone who is a firm non-believer who just "doesn't want to know" when the Christian faith is mentioned, it often stems from a bad experience they have had with someone who "called themselves a Christian" or of a church which was anything but the "living testimony to the love of God" that it ought to be.

If you are someone who, like me, professes to be a Christian then the way you live your life is absolutely vital. If your faith is real, it will show in the quality of your life and people will be attracted to the Christian faith through you. But if it's not real and you just go to church and wear the "mask" of being a Christian, people will see through it. The effect will be that non-believers will look at you and say, "If that's what being a Christian is all about then I don't want to know, thanks."

So, my appeal this month is to those of you who call yourselves Christians but who know in your heart of hearts that your faith *isn't* as alive and active as it could be. Do you read your bible? Do you pray? Do you meet with other Christians? If not, that might be part of the problem. If you *do* and yet you are *still* not full of life and love, why not go and see a Christian leader or even drop us a line – we might be able to help.

If not for your own sake, then for the sake of those who *don't* yet believe in Jesus, resolve to find out what is missing in your life and get it sorted out as soon as you possibly can.

Archive

Volume 4 • № 11 • August 1991

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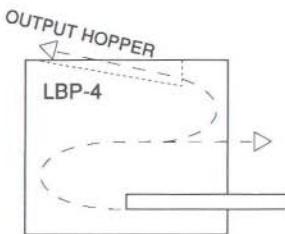
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Archive magazine is edited by Paul Beverley and published by Norwich Computer Services.

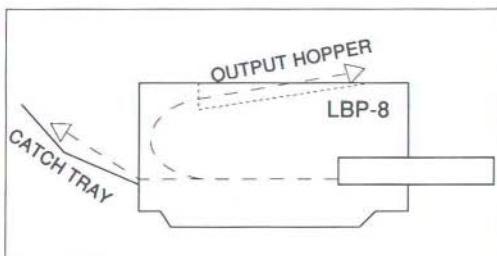
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Products Available

- **Arc Recorder** – Hybrid Technology have produced a very cheap system for sound sampling (£27.95 + £5 p&p +VAT). It consists of a microphone with a switch and desk stand linked to the computer via the printer port and desktop software that generates samples which can immediately be used in other desktop applications. (This is NOT the same product as produced by Oak Solutions despite the same name.)
- **Cartoon collection** is the title of a four disc set of cartoon type paint format clipart from Micro Studios. The price is £19.95 or £18 through Archive.
- **DeskJet 500** – We've had so many good reports from readers about the HP DeskJet 500 printer that we've worked out a special deal with our distributors. We can offer them to Archive subscribers at £395 inc VAT & carriage.
- **Econet test box** – ALSystems have produced an Econet test box which should greatly reduce the time and effort needed to rectify faults on Econet networks. It can detect broken cables, short circuits, cross-connected cables. It measures cable resistance. It has LED's for monitoring clock & data signals, a terminator tester and a filestore clock test facility. The price is £75 +VAT (+£2.35 p&p).
- **Eizo 9080i utility** – If anyone has an Eizo 9080i and wants to use it on the Archimedes, GL Consulting Ltd produce a utility for just £10 which makes it possible. For more details, see the 9080i review on page 39.
- **JISys** is a journal indexing system (also available for IBM and BBC B) which allows you to create your own journal article database. It allows search & retrieval and cross-referencing. It has an on-line manual, password for data protection and will cope with an index of up to 10,000 articles and authors. The price is £75 inclusive from KAS Software.
- **LBP4 laser printers** – There was a huge response to the special offer last month on LBP4 laser printers (on the back of the Price List). We had bought two printers from the distributor on their end of year clearance but these were sold by about 10.00 a.m. on the day after the magazines left this office! We could have sold them several times over that day and the next. The good news is that, because of all the interest, we've been able to arrange a semi-permanent special deal with the distributor. We can now sell the LBP4 with an extra 1Mbyte ram (useful when not using the Laser Direct interface) for just £875. This price does *not* include the 250 sheet paper feed tray, but the printer already has a 50-sheet tray, so it's not essential. If you do want a paper feed tray at the same time, add £90 (instead of the normal price of £105). When you add the CC Laser Direct interface at £380 to the LBP4 at £875, you get £1255 (my arithmetic was £100 out last month!) which is not *that* much more than the cost of the 300 d.p.i. Laser Direct Qume and as well as having the advantage of 600 d.p.i., you get a printer that will run on other computers and can even be connected via the serial or parallel interfaces (all standard on the LBP4) to other computers – or indeed to the same computer. You can then use the front panel switches to select which interface you use. This is useful if you want to use the printer in direct printing mode from, say, First Word Plus or from Basic. So, by comparison, why should anyone want to pay £1560 for the LBP8 Laser Direct since it can only be used with the Archimedes and not on other computers? Well, it is faster in terms of pages per minute (8 instead of 4) even though the page preparation time will be the same on both. Secondly, it looks to me to be a more robust printer which could be useful, say, in a school situation. The third point is that it has a straighter paper path. The LBP4 has an S-shaped paper path feeding into an output hopper but you can open a flap and make it C-shaped though it doesn't then



LBP4 has 'S' and 'C' shaped paper paths



LBP8 has 'C' shaped and straight paper paths

go into the hopper. The LBP8 on the other hand normally has a C-shaped path. (This is useful because it drops the sheets face down so that page 1 of a multi-page document is at the top of the pile when you take it out of the hopper.) If you fold out the catch tray at the opposite end to the input tray, you get a completely straight paper path, if you are printing onto labels or card so there is less chance of jamming and if you are printing acetates, there's less danger of them getting curled up. The advantage of the S-shaped path though is that the printer is more compact as a result. (See diagrams opposite.)

Paper trays are a little confusing with the LBP4 but I think I have got it sorted out now. Provided, as standard, with the printer is an integral tray which takes about 50 sheets at a time. As an alternative, you can buy a paper feed unit and cassette (Archive price £105). This forms a base under the printer and takes a removable paper cassette which carries about 250 sheets of paper. You can also get spare cassettes for the paper

feed unit so that you can have different types of paper in different cassettes. (Archive price £57)

- **Mandelbrot Set** – Explore Mandelbrot sets in mode 15 with this C program which goes to magnifications of 100 million. Partial or completed sets can be saved and re-loaded. The price is £12.95 inclusive from KAS Software.

- **PC Connect** – DT Software have produced an interesting new piece of kit for the Archimedes. It consists of a podule plus a board to go in a PC (or compatible) plus the appropriate high speed interconnection. The idea is that the two computers can then share peripherals including comms, printers and hard drives and you can even run the PC from the Archimedes' keyboard. The cost is just £169.95 +VAT.

- **PC Emulator upgrade** – To get your PC emulator upgraded to version 1.60 which we mentioned last month, you need to send the PC emulator disc to Acorn Direct in Wellingborough with a cheque made payable to 'Acorn Direct' for £34.08 (£29 + VAT). However, Learning Curve owners can get a free upgrade! If you talk to the dealer from whom you bought your A3000 or Archimedes Learning Curve, he should have a form you can fill in and send, with serial number and proof of purchase, to Acorn Direct and they should send you a free upgrade to 1.60. (*However, as I write (19/7/91) it hasn't actually appeared as a stock item!*)

- **Panasonic printers** – The KXP1124 printer has now been superseded by the KXP1124i which we can sell at an Archive price of £299 inc VAT & carriage. We still have a couple of the older KXP1124's which we can sell at £235. (The Archive price was £281.)

- **Saloon Cars** is here! 4th Dimension's new racing simulator is available now – Archive price is £23.

- **SCSI hard drive price drop** – The prices of most of the Oak Computers hard drives has dropped – see the Price List for full details. There will also be some big reductions to clear existing stock. These are listed on the back page of the Price List.

Products Available

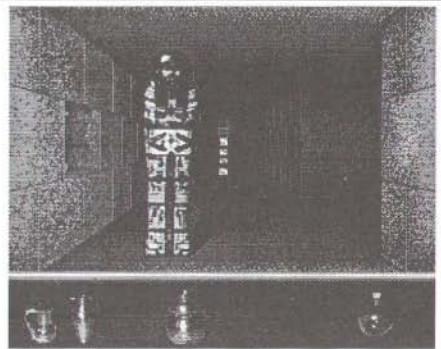
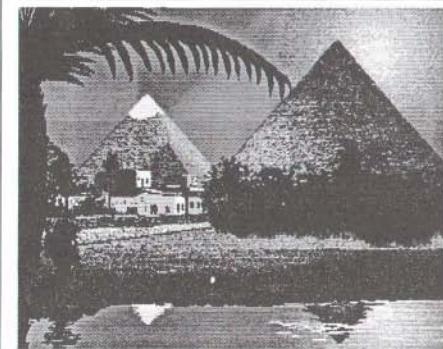
• Shareware №41 – Under the heading of ‘education’ are an animation of a four stroke engine, a control language for use in GCSE and a biology program relating to Mendelian inheritance. There is a floating point assembler Basic library and a desktop assembler test bed. The range of utilities includes: a comms utility, a utility which reads BBC tapes via an RS423 link to a BBC micro, a converter between ArcText, DOS, VAX and FWP files, a disc cataloguer, an Edward-ASCII converter, a utility that displays the current filing system, a filetype guesser and a desktop file loader. Finally, there is a superb golf game which, on its own, makes the disc worth the £3.

• STEbus interface – Intelligent Interfaces have produced an interface which allows the connection of up to four STEbus interfaces to be fitted to an Archimedes computer (only 2 on an A300 series or 3 on an A540) providing access to a wide range of I/O devices including A/D, D/A, parallel I/O, serial I/O, networking interfaces, stepper & servos controllers etc, etc. The interface costs £495 +VAT.

Review software received...

We have received review copies of the following software and hardware: !ReaderS, !MapIT (Genesis II application), Guardians of the Labyrinth (Soft Rock Software), Animynd Life, OutLook for Eizo 9080i. A

Coming to an Archimedes near you soon !



 Tale of Anubus 

Hints and Tips

- **Running applications** – Carrying on from Hugh Eagle's tip about running one application from inside another, on a A310, if you only have floppies and have, say, a DTP !Impression disc with !PrinterDM, !FontDraw and !DrawPlus all at the same level, you can tailor the !run file of, say, !Impression to load other applications at the same directory level, dependant on memory, by using the command

```
*desktop <obey$dir>.^.!second_
application_name
```

the <obey\$dir> sets the filing system into the first selected application (!Impression.) and the ^. takes it back up to the level you were at first! The next application then loads on the desktop ready for use. Repeat the line with “!third_application_name” and so on. Ned Abell

- **Colour separations** – Last month, there was a question from John Oversby about a colour separation program for !Draw or sprite files. One solution is to use DrawPlus (Careware 13), actually drawing different colours on different “layers”. Another possible solution revolves around the Impression Business Supplement which provides colour separation for PostScript files. However, the ideal solution is a simple “filter” program which takes in a !Draw file and selects all objects of a particular colour and puts them into a new !Draw file. Does anyone know of such a program? I would be interested in using this for producing double-sided printed circuit boards using !Draw. It is easy to write a Basic program to do this starting from the !Draw format as specified in the PRM – I could even do this myself – but making it RISC-OS-ified is another matter. Brian Cowan

Impression H & T

- **Business Supplement** – Like many of you I was excited about the release of more software for serious users of Impression II. The addition of the mail-merge facility is particularly useful. However, I have noticed that it suffers from a

problem that early versions of Impression had. Namely, using the * print facility causes the print to crash after the first document with “Invalid number of output bits” in multiscan mode. The problem is resolved by switching to mode 15. Also, beware of forgetting to load your RISC-OS printer driver before requesting a print from !Importer. This is because it won't warn you that you will receive a draft copy – and worse, you have to close everything down and start again.

Another word of warning to those of you planning to buy the supplement thinking that the WordStar loader will solve all your translation problems – it doesn't (not on my version, anyway)! If I had thought about it, the result one gets is obvious. All the ASCII spaces that mess up justification are stripped – but this is at the cost of losing a space at the end of a line. Consequently, numerous words are joined together. If you are prepared to use the spellchecker to separate the words again the utility is fine and it does stop those messy spaces appearing whenever you make an alteration to the text. However, it's still hard work! John Brocks

- **Font usage** – Is there a product or would someone like to write an application which takes an Impression document and tells you what fonts are required? The reason for this is that some PD software includes documentation prepared in Impression format. This is a great idea but sometimes strange fonts are used. If you are using Adrian Look's !FontDir (Shareware 36) then you need to know which fonts are needed before Impression is booted up. Brian Cowan

That should be easy enough. If you want to do it manually, you can save the text of an Impression document with styles and look at it in Edit. You can search for "font " and look through all the references to particular fonts as they occur in the style definitions and as effects within the text. Mind you, that will give you the fonts that appear within the style definitions regardless of

whether those styles have actually been used in the document. Anyone want to have a go at writing such an application?

Is anyone interested in / able to convert between the Impression Document Description File format and TeX? I think it should be possible since both contain the same sort of information. This would be useful for scientific applications where many journals accept material on disc or by wire in TeX format. Brian Cowan

- **Labels and tickets** – When I was printing video cassette labels onto a roll of adhesive labels they were printing too far to the right. I failed to understand that !Impression is smart and says, "right, you are printing a document 165mm wide. I will print it 82.5mm to the right and left of the centre line of the printer". I have a mark on the case of my Citizen 120D printer to align the left hand side of A4 paper, when putting in individual sheets but I can't centre different rolls of labels accurately without putting several marks on the case which would be confusing so I got round the problem by designing new master pages that are always A4 width (210 mm) and creating a frame on that page that is the right width for the labels and off centred to the left. I continue to put the label roll edge to the mark.

I then had to change the !Printer DM page size to one 102mm by 210mm wide which gives me the the right "greying" on the screen as I have "Preferences", "Show page borders", switched on. This prints two perfect sets of labels but I still get unwanted form feeds at the end of the page! (Example supplied on monthly program disc.) Ned Abell

- **Retaining styles** – Hugh Eagles's question about setting a style in a blank Impression frame (Archive 4.9 p11) can be answered in terms of 'Place holding' in the same way as my hint on re-aligning lines starting with a different font (Archive 4.8 page 11). Just set the style and type a 'null' character in the frame (i.e. one which is not defined in the font you are using) by using Alt and the keypad numbers. (EFF fonts are rapidly filling up, making null characters harder to find, but try 136 or 139.) Bruce Goatly

- **Un-deleting** – As you probably know, you can highlight a passage, type over it and thereby replace it. Well, if you have second thoughts immediately afterwards, you can restore the original by highlighting the replacement passage and typing <ctrl-V>. This deletes the replacement altogether rather than cutting it to the clipboard; the clipboard still contains the original version. Bruce Goatly **A**

Help!!!!

- **Mac Scanner** – Does anybody know of software to use a Mac AppleScanner with a SCSI interface on an Archimedes? Brian Cowan
- **Podule expansion** – Does anyone know of an expansion box which allows more than 4 modules to be attached to an Archimedes computer at any one time? A G Duckett, Telford. **A**

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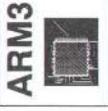
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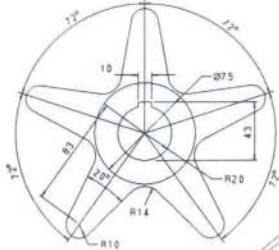
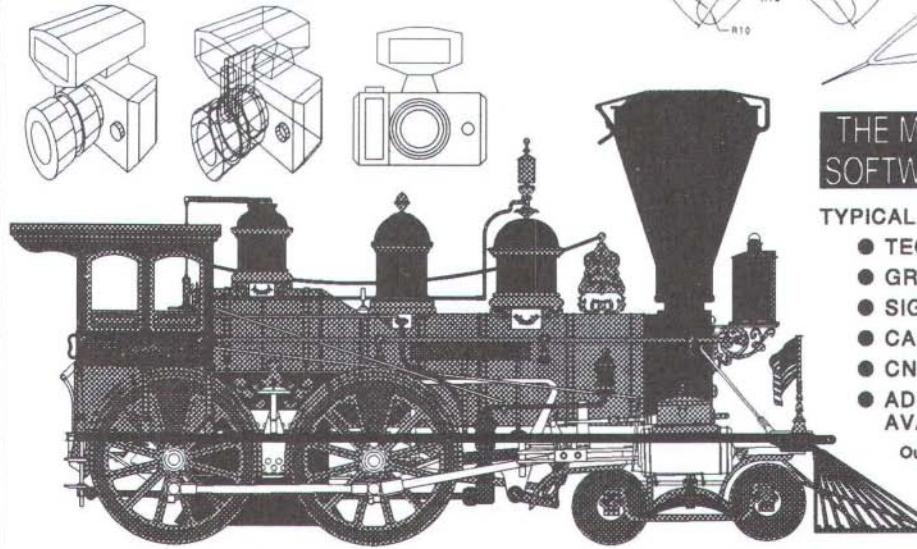
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Hardware Column

Brian Cowan

By all accounts, the October Acorn User Show at the Wembley Conference Centre will be an exciting event (*Wembley Conference Centre, October 11th - 13th - We'll be there! Ed.*). There should be a number of new hardware products for the Archimedes range, some of which we have been anticipating for quite some time. Also, there might even be new machines from Acorn. But first a history lesson!

Floppy disc capacity

Before the Archimedes 300 range was released to the public, way back in the summer of 1987 (was it really that long ago?) there was a pre-production model produced for software developers and other lucky people. A striking feature about this machine, I think it was called the A500, was that it had a disc controller chip and a floppy disc drive capable of supporting the high density 2 megabyte (unformatted) discs.

As we all know, when the production machines appeared, starting with the model 305, we were back to the 1770 family controller chip running an ADFS not exceeding 800 kbytes. In the DOS emulation environment, the maximum floppy disc density was then 720 kbytes. These days that is pretty prehistoric; Acorn's decision was a retrograde step.

I think that the only area where this is of crucial importance is in reading and writing DOS discs – and DOS compatibility is vital – but more on that later. So what would we like on the floppy drive front? Ideally some enterprising company would produce a new floppy disc drive interface and a high density drive which would replace the machine's internal disc drive. Then we would need a modified ADFS supporting 1.6 megabyte capacity and the facility to access high capacity DOS format discs as well. I understand that one of the "quality" companies is working on just such a product. So look out at the Show.

PC emulation

By the time you read this, the new PC emulator should be available. This is the multitasking all-singing all-dancing version we have been waiting for. Apart from the facility of operating in a window (if you have sufficient memory for this), other improvements are support for up to four hard disc partitions, EGA and MDA graphics modes and "partial support for VGA".

The old version of the emulator provided only CGA graphics. As I understand it, the reason for this was the speed constraint. Emulating the DOS screen was a serious speed bottleneck. So one waits in fear as to the speed of this new emulator operating in the fancy screen modes. I think things may be speeded up through the use of the Acorn font manager to supervise writing to the screen under emulation but we will have to wait and see. What speed increase can be obtained from an ARM3? Presumably the emulator code has been written with the ARM3 cache in mind. The turbo RAM of the Archimedes 540 will also give a modest speed increase; I will have to run some benchmark tests.

There are some other questions concerning PC emulation. What actual CPU is being emulated? Is it *really* still an 8086 or might it now be a '286? The emulator will emulate the presence of an 8087 maths coprocessor; a really good idea.

DOS cards

Continuing with the topic of the (anticipated) poor speed of the PC emulator, brings us to the sore point of DOS "second processor" cards. Again rumours abound, but we all know what happened to Mach Technology (but do we really know what really happened?). The time and the place to look must be the October Show. I hope to see at least one company exhibiting a DOS card.

There is real potential for some clever design here, so balancing performance and price could be quite tricky. Although two years ago we

would have been "over the moon" with a '286 card which made our Archimedes simply pretend to be an IBM AT, things have now moved on – particularly with the new multitasking emulator. When you consider that even with a real DOS CPU there is still the problem of screen emulation, you will realise that a DOS card will need to use a lot of code similar to that of the software emulator. The DOS CPU could even "hook in" to the emulator software....Let's wait and see what the boffins come up with.

A few further points to ponder. If the DOS card has a floating point 'x87 chip then this could be commissioned, in the background, to help the ARM chip in doing its floating point work. Or DOS peripherals could be accessed by the Archimedes. There are some very exciting possibilities for cross-CPU cooperation.

New machines?

In past Hardware Columns I have noted the fact that, frequently, third party add-ons presage features of new Acorn machines. The Aleph One ARM3 add-on was a good example of this as was the Atomwide VIDC enhancer.

Since Acorn already publish the format specification for high density ADFS floppy discs in the PRM, it seems likely that if new machines are to be released, they will incorporate high density floppies. Add to this the fact that at least one university was reluctant to purchase a suite of Archimedes machines precisely because high density discs could not be used. It must be good sense to move in this direction. (*Take it from me, 2M floppies are a pretty safe bet. Ed.*)

However, I doubt that we will ever see an Archimedes with an on-board DOS CPU. I sympathise with the Acorn view of wanting to go forward rather than backward, but one must be realistic. I think that one of the advantages of a DOS card will be that confirmed DOS users might be encouraged to purchase Archimedes machines because it is then an adequate PC plus a whole lot else.

Things seem to have gone quiet on the portable front but rumours abound concerning a new

"version" of the A3000 with an ARM3 and 4M of ram, to be sold at a competitive price. I don't quite see who this is aimed at; I would much prefer to see the existing A3000 reduced substantially in price, together with an extensive and aggressive marketing policy.

If there are new machines on the way then one might speculate as to their features. I have already mentioned high capacity floppies but let's think about hard discs. ST506 is becoming obsolete and IDE drives are getting cheaper and cheaper. However, SCSI remains the most versatile interface. So, at the low end of the market it is possible that a new A3000-type machine might well incorporate an IDE interface, possibly with space for fitting an internal drive. If Ethernet were available at a reasonable price then such a remodelled A3000 could sell like hot cakes to the "serious" user.

Scanning – the hard way

Although I have been lucky in having a chance to try out many hardware products for the Archimedes, a scanner has not been one of these. I recently had the need to scan an image for a DTP application, but I had no scanner. However, a Mac in my laboratory was equipped with a very sophisticated flat bed scanner. Actually, the scanner had a SCSI interface as does my office Archimedes (I know what you are thinking! – but the software would be prohibitive).

This is what I decided to do: I would scan the image on the Mac and store it in TIFF format on the Mac's hard disc. So far so good; that worked. Next, I used a product called Apple File Exchange to write the file, using the Mac, onto a DOS format disc. Eventually that worked. The problem was that a full A4 page required just over a megabyte whereas the DOS disc could only hold 720k. (Now you see my interest in high capacity DOS discs!) I had to content myself with half a page and then I was able to fit the image file on the disc. Next I loaded up MultiFS on my Archimedes, inserted the disc and opened up the directory viewer. There was my file shown on the disc as a PC file. I simply dropped this file on ChangeFSI and there on the

screen was my scanned image ready to be exported as a sprite into Impression.

I learned quite a lot from this ordeal. They say that the Mac has the best user interface going. Rubbish! Using a Mac is like trying to drive to work on a lawn mower. It is slow, non-intuitive and highly annoying. I came away fully appreciating the staggering power of my old Archimedes 310. I know that our secretaries become frustrated with the difficulties they encounter with their Macs; now they certainly have my sympathy. Unfortunately, I fear that my colleagues would regard it as but another eccentricity if I were to suggest wholesale conversion to Archimedes. However, a DOS card just might tip the balance my way.

ROM speedups

Last month I wrote of a few potential problems concerning the speeding up of ROMs by reprogramming the MEMC chip. My 540 has EPROMs and these certainly won't run faster; hopefully the release ROMs will. I thought there was a problem with one of the 410/1 machines. From time to time the screen would try to "disintegrate". I thought that speeding up the ROMs was the problem, but it now appears that a marginal

VIDC chip was the culprit. So I have encountered no problems with the ROM speedup.

Programming EPROMs

About a year ago there was an announcement from a company calling itself Racing Car Computers. They were advertising an EPROM programmer for the Archimedes. In my laboratory all we have is a rather feeble programmer purchased many years ago for the grand sum of £20 from a company called Solidisk (remember them?). It seems that Racing Car are having production difficulties so my programmer has not arrived. However, they did send me a demonstration disc of their software and it looks good.

It is amazing, but if software follows Acorn's RISC-OS guideline, the most complex of things can become quite simple to become familiar with. I looked at the Racing Car code which at present is mostly in Basic. It certainly is impressive, providing a full range of programming algorithms for the various EPROM manufacturers. If you are desperate for an Archimedes-based EPROM programmer then there is an RS232 driven device available from Farnell Electronics which has software for driving it from an Archimedes. However I shall wait for my racing car! A

Matters Arising

- IFDD?** – The launch of the promised Citizen IFDD drives (Archive 4.7 p57) is a bit up in the air at the moment. I'm told that the launch of the 20M drives is being delayed due to discussions in Japan with competing manufacturers who wish to come out with drives that conform to a standard. That's good news!

A 4M drive seems to be coming on stream in that "ED" drives are appearing in products – for example a new jingle player from Soniflex which stores 16bit audio on 2M ("HD") or 4M ("ED") discs. I'm not told who the drive manufacturer is but the discs are from Verbatim and are £6.15 retail for a 4M formatted disc. Ned Abell

- Public Domain confusion** – Last month, Robert Chrisman referred to FontEd as "public domain" software. We should point out that this is not strictly true. Acorn Computers Ltd have allowed us, along with other Acorn dealers, to distribute FontEd to customers and have allowed us to make a charge for supplying it but they have not released it into the public domain – it remains the intellectual property of Acorn Computers. The reasoning behind this is to try to maintain some degree of control about which version number of the software is available. Newer versions are made available to those who are doing the distribution.

(Also, we said that FontEd was available on Shareware 7 – it's not – it's on Careware 7. That was Ed's fault!)

- **Toolkit Plus** – Following the hint last month (p9) about modifying Toolkit Plus to make it work on E-format and SCSI, Dave Clare from Clares Micro Supplies, points out that (a) the modification will not work correctly in all circumstances and (b) it is not necessary anyway because version 1.01 of Toolkit Plus, which has been available for about a year now, deals with

E formats and various filing systems. To obtain your free upgrade, send the original program disc plus an S.A.E. to Clares.

- **Virus Target** – On this month's magazine disc there is a target application which will report if it has been attacked by a virus and so help to catch any infection a little earlier. The author also recommends that users attempt to modify the program themselves to reduce detection by an invading (and therefore possibly an evading) virus. A

Chocks Away Extra Missions

David Markland

This is a new exciting upgrade to the original Chocks Away flight simulator from The 4th Dimension. You need the original Chocks Away to run it and it is copy protected so cannot be used from hard disk. It contains 16 new maps which includes one that enables you to take off from underneath a pier. There are new flying conditions which include blizzards and night flying. The digitised sound has been much improved. There are over 1000 new targets which include Zeppelin Airships and extremely large Super-Tankers.

The vector graphics are improved and you can opt for more detailed, but slower, graphics while flying which is useful for identifying planes and taking reconnaissance photos. For long distance flights there is a Fast Forward option which makes you go 5 times faster, but this can only be used when there are no enemy targets or planes around. There is also a graphics outliner which highlights various targets.

You now have a wide range of views from enemy targets or from the phantom plane which you can control while watching recorded flights. The enemy have clever pilots now which make them harder to tail and shoot down. Some of the missions take a bit of practise but are more fun than the old Chocks Away ones.

Chocks Away permits two player games and is easier to use than either Interdictor 1 or 2.

Chocks Away is, however, fairly primitive until Extra Missions is added. Chocks Away with Extra Missions is not a game to get bored of quickly and is fairly realistic. My review copy has seen hours of 'field testing'! If you have the original Chocks Away then you really should get a copy of this add on since it's well worth £20, although I would recommend taking a look at MiG-29 if you don't already have Chocks Away. MiG-29 appears to be a cross between Chocks Away and Interdictor.

The serial link option enhances two player games to full screen mode and is a good idea if you have two Archimedes next to each other. I think that it's a bit bad though that the A3000 doesn't have a serial port; unless you buy extra hardware (£21 per machine) the link up is not possible. There is an ARM3 option for those who have an upgraded machine or an A540.

If I had to give it marks, it would get:

Sound	8/10
Graphics	9/10
Playability	10/10
Life Span	9/10
Overall	9/10

On the whole these look rather good but I have to say that the best flight simulator I ever played was the one by MicroSoft which I ran on a 386 with a VGA screen and it is miles better than any Archimedes game. A

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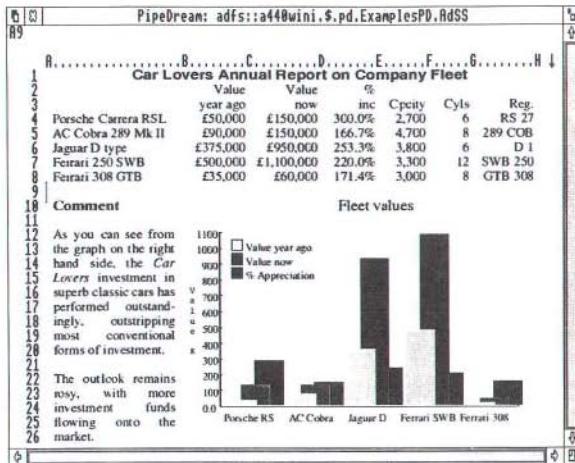
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All trademarks acknowledged. The chart in the screen shown above was produced by sending numbers from PipeDream 3 to Lingenuity's Presenter 2 and then loading the resulting graph back into PipeDream 3.

Colton Software, Broadway House, 149-151 St. Neots Road, Hardwick, Cambridge, CB3 7QJ, England.

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Gerald L Fitton

The most substantial 'matter arising' out of last month's PipeLine column is calculating times in hours minutes and seconds (time has not yet been decimalised!) so that subject, and hence integer arithmetic, comes in for extensive treatment this month. But first...

National Curriculum

Ron Pearcy is the Principal of Irongate School, 17 Donegal Crescent, Napier, New Zealand. He is still requiring National Curriculum files for use with PipeDream. In particular, he needs the files for Maths, IT, Social Studies and English Language. Now, here I have a confession to make. I remember that someone wrote to me letting me know that all the National Curriculum files were available through NERIS (an on-line database which can be accessed directly or through a Prestel gateway). I filed the letter so carefully that I now can't find it! I don't have any telephone communications equipment which works with the Archimedes (and I've cancelled my subscription to Prestel). I vaguely remember asking whoever it was if they would download the files and let me have a copy. I have looked through all the discs I have but I can't find any NatCurAT or similar. Anyway, what I'm getting round to slowly is that, if you do have a means of accessing NERIS (can they be contacted by post?) and feel able to help Ron Pearcy then I'm sure he would like to hear from you – and so would I.

Ron's PipeDream samples

Included on the Archive monthly disc are about a dozen files from Ron which will be of interest to those of you in education. If only in return for these files, can you help Ron with his National Curriculum information?

Error – Filecore in use

William D Hine runs both Ovation and PipeDream simultaneously and transfers files from one to the other. This 'bug' is annoying him and he would like to hear from anyone else to whom

it happens, particularly if you have even a partial solution. Send your letters to me at Abacus Training and I will pass them on to William.

FontMenu module not found

If you get this error then I have a copy of the module and I can help you. Drop me a line (or a disc).

Highlight 3

See Archive 4.8 p36 for details of this gripe by Peter Nye. Stephen Gaynor reports that highlight 3 *can* be used as a general extended sequence. As an example, suppose "E" is underline on and "R" is underline off, then 3Eabcdef3R will print abcdef. Note that, in PipeDream the 3s will appear in inverse video (white on black) when, and only when, the cursor is in that line.

Recalculate & print

Alan Hight complained that, when running a macro which contains recalculation and printing, the printing sometimes starts before the recalculation is complete (not what he wants). Stephen Gaynor says this point was covered by Albert Kitchenside's article on the January 1991 PipeLine disc. My recollection is that Albert introduced pauses but I can't remember how!

Linking files

Colton Software insist that linking files are a hangover from before the days of dependent documents. Although 3.14 is considered 'stable' and no upgrade is likely in the near future, how would you feel if V 3.15 did away with linking files? I shall be interested in your views. Stephen, like me, thinks that there are some things you can do with linking files that can't be done with dependent documents. Have you got any examples that I can send on to him for his research into this? I will show your examples to Colton Software if I get enough good ones.

Macro\$Dir

If you write a macro which needs to find a file which is in the same directory as your current files, then using the path name <Macro\$Dir>

will allow you to copy the whole directory of files to another disc without having to rewrite the file names within the macro. I need a few examples of how to implement this idea. Can you help?

Base 60, 24 and others

Now to the tutorial but, as usual, please bear with me whilst I build up to it slowly with a digression or two.

Most of the sums we all do these days are in base 10, denary. Most of the sums done by computers are done in base 2, binary. I know quite a few people who can do sums in base 16, hexadecimal, in their head and, as you'll see from the next paragraph, not all of them have a degree in computer studies!

Here's a simple problem in base 16. You have two parcels, one weighs 1lb 14oz and the other weighs 2lb 6oz. What do the two parcels weigh together? Answer 4lb 4oz.

You might be one of my more 'mature' readers who used to do mental arithmetic in a system which used both base 12 and 20 (or even octal – base 8)! Here's a sample question in such a mixture of bases that will be familiar to our more mature readers. What would have been the cost of 12 gallons of petrol when it was 5s 10d per gallon? The answer is £3/10/0d!

I hope that these two examples show that number bases other than 10 (denary) have been around for some time and that you don't have to have been steeped in computers to have used them and to understand them.

I'd like to build up gently to a question for the expert. Let's start by considering a few properties of numbers in base 10.

Any fraction can be expressed as either a terminating decimal or as a recurring decimal. Examples of terminating decimals are $1/4 = 0.25$ and $3/20 = 0.15$. Examples of recurring decimals are $1/3$ which is 0.3333... and $1/7$ which is 0.142857 142857 142857 With recurring decimals the series of numbers goes on for ever. It is possible for you to predict which fractions will terminate and which will not by resolving the

denominator (the 4, 20, 3 or 7 of the above examples) into their prime factors. The prime factors of 20 are $2^2 \cdot 5$. Now, here is the rule. If the prime factors of the base (in our case, base 10, these prime factors are 2 and 5) are the only factors which occur in the denominator (e.g. 20 which can be made up out of multiplying 2s and 5s) then the decimal terminates. Because 17 can not be made up out of 2s and 5s the fraction $1/17$ does not terminate ($1/17$ is a recurring decimal having a 16 digit cycle).

Now here's the first question for the expert. Can the number one tenth (0.01 in decimal) be stored accurately in a computer which 'works' in binary? Too hard? Here's an easier one. Does the fraction one tenth terminate when expressed in binary? The answer is "No!" because 10 is not a power of 2, one of its factors is 5. Only numbers such as: $1/2$, $1/4$, $1/8$, $1/16$, etc terminate in binary. So, the answer to the expert's question is that 0.1 can not be held accurately on a computer which stores numbers in binary because the non terminating representation has to be truncated (cut off) somewhere. Look at figure 1 below. I have added 100 lots of 0.1 in cell A102, in A103 I have subtracted 10 from A102 and you will see that the Archimedes is short by about 0.00000000000002. This small error, called a truncation error, is the effect of working in base 2 instead of base 10!

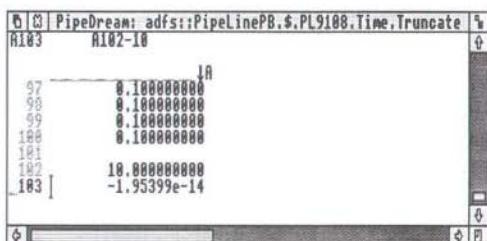


Figure 1

How then would you prevent a truncation error (in base 2) such as that of figure 1 which would not occur if you worked in base 10? The answer is to use binary coded decimal instead of binary! Of course, whatever base you use, there will always be some fractions which can not be held

exactly. Isaac Newton wanted us to change from a base of 10 to a number base of 12 for all scientific numerical calculations because he knew it would reduce truncation errors (12 is divisible by 3). The ancient Egyptians understood that it would be a good idea to use a base which is the product of many of the lower value primes. They chose 60 as their number base because it can be divided exactly by 2, 3, 4, 5, 6, 10, 12, 15, 20 and 30. It is because the Egyptians chose 60 as their number base that we, like them, have 60 seconds per minute and 60 minutes per hour. Whatever other decimalisations occur, I believe it will be a long time before we change to a decimal system of say 100,000 seconds in a day. Maybe by then, with everything worked in binary, we will have 64ksec in a day (ie 64*1024 seconds). Until that binary coded day arrives we will have to use integer arithmetic with base 60 if we want to preserve perfect accuracy when doing sums in hours, minutes and seconds.

Integer arithmetic

As well as the PipeLine disc contributors Dr Mike Clark and David Turner, I have had a succinct letter from J V Parker about time calculations. The tutorial which follows uses many of their ideas plus a few of my own.

PipeDream: adfs::PipelinePB.\$PL9108.HrMinSec					
D12	sum(D5D10)+D11				
	A.....	B.....	C.....	D.....	E.....
1					
2	Ludwig Van Beethoven: Symphony No 5 in C minor, Opus 67				
3					
4	Movement	Hours	Minutes	Seconds	Seconds
5					
6	1 Allegro con brio	0	7	28	448
7	2 Andante con moto	0	11	21	681
8	3 Allegro	0	5	34	334
9	4 Allegro	0	12	2	722
10					
11	Next Carry	0	1		
12	Sum+Carry	0	36	77	2177
13					
14	Total Time	0	36	17	
15	Check	0	36	17	

Figure 2

Figure 2 shows a spreadsheet designed for the addition of times expressed in hours, minutes and seconds; they are the playing times of tracks on one of my compact discs. I'm sure that, when you've worked through the tutorial, you will see that the principle employed, of using only integers in every cell (called integer arithmetic), can be extended to multiplication, division and even to evaluating functions such as inverse sine (with the answer in degrees, minutes and seconds of arc).

If you have the Archive disc then load the file HrMinSec. If not then you will have to work from figure 2.

The block C6E9 is made up of numbers (entered as expressions with <F2>). The formula in cell D12 is sum(D5D10) + D11. Although the numbers to be added are in rows 6 to 9, I have summed rows 5 to 10. The advantage of including the two dummy rows (5 and 10) is that you can insert or even sort the rows 6 to 9 without affecting the sum(D5D10) formula. Dummy rows of this type are 'good practice' in a spreadsheet. The formula in cell D12 can be replicated to C12 and E12. Cell D11 contains int(E12/60). The 77 seconds in cell E12 is divided by 60 to convert it to minutes and decimals of a minute. The function int is the integer part of the value of (E12/60), i.e. the integer number of minutes, 1, which has to be carried over into the minutes column. The formula in D11 can be replicated into C11.

The formula in cell E14 is mod (E12,60). The function mod is the integer remainder after dividing E12 by 60 i.e. it is the number of seconds left from E12 after carrying the minutes over into D11. The formula in E14 can be replicated into D14 and C14.

As a check, I have used column G to convert the minutes and seconds of columns C, D and E into seconds (I remember that this is the

way I had to do it at school when I was about 7 years old). Column G is summed in cell G12 and converted to seconds, minutes and hours in cells E15, D15 and C15 respectively.

The important concept to grasp is that 77/60 is not stored as 1.28333333333... minutes (which has to be approximate in both decimal and binary because of truncation errors) but exactly, by splitting it into two parts (shades of complex number pairs – but more of that another month), the two parts being 1 minute and 17 seconds where the numbers 1 and 17 are found by using the PipeDream functions int and mod (as in the example). The everlasting calendar application which I devised some years ago (included on the October 1990 PipeLine disc)

uses integer arithmetic in this way but the functions are more complicated. By the way, I'm sorry but, on the first few October 1990 discs I dispatched, the year 2000 (but no other year) is one day out due to an error in cell W6. In October 1991 I shall be issuing a revised version of this disc so, if you can wait until then, you can get the corrected version (plus other 'upgrades').

In conclusion

If you have an interesting example of integer arithmetic then I shall be most pleased to hear about it. Please write to me at the Abacus Training address on the inside back cover of Archive. I would prefer you to send your application on a disc rather than as printed text. You will get your disc back, honest! A

Arc for the Anxious

John Oversby

Resource is an organisation presently supported by the Local Education Authorities of Humber-side and South Yorkshire. In its time it has produced educational software of a very high standard, aimed at children from Primary to Sixth Form. Sadly, it is about to be closed down because of lack of funding and "Arc for the Anxious" will be one of its last publications. Its loss will be a big blow in the educational world.

Alison Tyldsley has aimed this booklet at newcomers to the BBC A3000, although most of the contents will apply to any of the Archimedes range of machines. It starts from basics such as: This is how to join all of the equipment together and This is where the mouse fits in, or, This is what a filer window looks like.

About half of the booklet is devoted to starting off on the A3000 and Archimedes machines, in simple language. It received an initial warm welcome from both adults and pupils in my school. I was surprised to see that the illustrations, particularly those of screen displays, had been drawn especially and were not the more realistic versions captured directly from the screen. I prefer the latter. In seven A4 pages, it covers connecting things up, windows, disc filing (which it

strangely calls disc structure), resetting the computer, formatting and copying discs (but not using the RAMdisc) and printing. The section on printing was, I felt, too brief to be really useful. There were many useful sections I felt ought to have been included, such as ways of copying parts of discs and using directories to provide simple screen displays and saving display time.

The rest of the booklet is about !Draw and Pen-Down for the Archimedes. We use PenDown throughout the school but this package comes with an excellent User Guide aimed at the right level for beginners, so I do not think I will be using the Resource version. In place of !Draw, we frequently use !Draw+ (Careware 13), which we find much better. I have had to produce my own booklet for this so I think I will stick to that.

Summary

If you really are new to the Archimedes then I would choose !Help from Sherston Software with its helpful disc and sections on !Draw and !Paint. A good try from Resource but I feel they should try again. It is certainly not in the same category as its "IT for the Terrified" for the BBC range which was comprehensive and very useful.

Arc for the Anxious £4.95 from Resource. A

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Chess on the Archimedes

Rajan Bedi

After the long awaited arrival of Chess 3D by MicroPower (the authors of the infamous Dr Who have returned), a comparison between this package and the popular package marketed by David Pilling could be useful for potential buyers.

Chess 3D by MicroPower (v.1.33)

Chess 3D is packaged in a nice mega sized container, about the size of two VHS video tapes. My initial reaction to this was, 'this should be good', and you can just imagine my horror after opening the packaging – all I found was a disc and a registration card (a severe case of overpackaging). 'Where are the instructions', I thought until I noticed the small print on the disc label stating that the instructions were present on the disc.

The program installs and runs like any standard multitasking application (RISC-OS required) and will run on a 1Mb machine. The screen display is quite impressive with most of the screen been taken up by a large three dimensional traditional chess set. A small overhead view is also provided which proved to be very useful.

As is the norm nowadays, you have the option of playing against the computer or against another homo sapiens. You can even get the computer to play itself and not only is this fun to watch (particularly with a three dimensional view), it is also very educational. Micropower have used a sort of a 'traffic light' structure to control the software which really only becomes obvious after having read the instructions.

You move by clicking (on the 3D display or the overhead display) on the square you wish to move from, which then becomes highlighted, and then on the square you wish to move to. If the move is valid the pieces will change position and the opponents clock will start. If the move is invalid a two-tone beep is heard. The computer plays a mean game with the level being set by

allocating how much time the computer has to respond. Conventions such as 'En Passant', Castling, Scholar's Mate and all piece promotion are catered for.

The package is excellent for beginners and improvers as well as advanced players of chess. An edit option is provided allowing imaginary scenarios to be set up and played. The game can be paused and play can be resumed from an earlier move or edited and play resumed from this new position. The user can also force the computer to move as well as having the option of getting the computer to help in providing suggested replies.

As the computer plays, it uses a book of standard openings and moves which it will follow as long as you match its moves as it expects. If you don't, the book icon closes and the computer starts 'thinking' about its next move. MicroPower have left room for more moves to be added to this book by using the disc drive icon. Both the original or the customised book can be printed, as can the list of moves of any game.

On machines with at least 2Mb, up to three games can be played simultaneously (good for school chess clubs). The program makes full use of the speed of the Archimedes, although, with three games running simultaneously, the clocks run slower. Sometimes it can be difficult to study the three dimensional board, so a lot of use is made of the overhead view. However, the main board can be rotated by 90° or 180° to overcome this. The program disc is copy protected and the program functioned incorrectly when my backup copy was executed. However, Micropower explicitly states that they will replace the disc if you experience loading problems.

Conclusions

Overall, this is an excellent product which has been very professionally produced and should be a part of your library. I look forward to the next exciting instalment to be offered by Micropower.

Chess by David Pilling (V.1.27)

This chess program marketed by David Pilling installs and runs like any other multitasking application. Both programs allow you execute some other task while the computer is 'thinking' of a response and will inform you when it is time for your next move by beeping. It runs on a 1Mb machine and the display is a very good overhead view. The program is controlled using the standard intuitive menus provided by the Wimp resulting in software which is very easy to use.

The game offers the same options as Chess 3D. You can play against the computer, another human or have the computer battling it out against itself. Once again, the standard of play is very good with the level being set by controlling the time in minutes the computer has to make sixty moves and the number of moves ahead the computer can think.

Beginners and improvers are also catered for with the same editing facilities provided by Chess 3D also present in this package. The moves list can be saved to disc and printed and, like Chess 3D, a game can be saved and returned to at a later date.

Conclusions

This is a very good product and at £5.99 represents excellent value for money offering nearly all the facilities provided by Chess 3D.

Chess 3D vs Chess

Overall, both products are very good, fully RISC-OS compatible and suitable for all ability levels. Both packages compare very favourably with IBM (yuk!) equivalents such as 'Battle-chess' by Interplay and 'Chessmaster 2000' by The Software Toolworks. For value for money, Chess by David Pilling is unbeatable, and for a few small extras and some nice graphics then Chess 3D is a good one for your collection. A

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ProTips

Peter Jennings

This is a column of hints and tips for users of Protext 5. It is not intended as a regular feature to rival PipeLine as there are probably not yet enough users of the Archimedes version of Protext to support it. Arnor have promised to keep me informed of developments to Protext, particularly the eagerly awaited RISC-OS version, and I will pass the details on in future issues of Archive, along with any hints or tips that pioneering users of this exciting new word processor may care to send by way of Paul Beverley.

In the meantime, here are a few hints of my own plus advice on an irritating bug that has emerged from the software since I completed the review in last month's Archive.

First the bug, which has suddenly appeared after lying dormant during three months' constant use of Protext. It shows itself during attempts to save a file, either manually or automatically, with two messages, one saying that the file "PROTEXT!X" or "PROTEXT!T" cannot be found and the other: "Error creating file". More alarmingly, the text sometimes disappears from the screen. Any further attempt to save brings a "File open" message. My description of this as "irritating" may seem rather inadequate but, in fact, it is not disastrous and can be dealt with quite easily. When the message about PROTEXT!X appears just type "close" at the command line, followed by "s" (for save). Your original file name will then be offered and pressing <return> will duly save it.

Arnor have not given me any fix for this fault but have just said, rather uncertainly: "We think we may have solved the problem in the next version of Protext." Let us hope they have.

Omissions

Two strange omissions from Protext, so far, are a function key strip and an icon. If you dislike the boring default applications icon, or the blank squares representing files, you can always design

your own icons, using !Paint. First create a directory for them, called !Sprites, inside the main !Protext directory. Then design an application icon named !protext and a files icon called file_cdf, with additional small versions if wanted. Finally, add an initial line to the !Boot file: "IconSprites <Obey\$Dir>!Sprites". If you are not sure how to create icons there are instructions in the chapter on "Paint" in the User Guide or you can find a set of ready-made sprites in a !Sprites directory on this month's program disc. You can just copy !Sprites into the !Protext directory but do not forget to add the IconSprites line to the !Boot file. The ready-mades have a simple "P5" design, with a border round the files sprite, but are colourful enough to be readily identified in a desktop directory.

A do-it-yourself function key strip is also easily made, either using a program which provides a template or by starting from scratch with Protext's excellent line drawing facility. One made this way is also on this month's disc. It has to be printed in two sections, one below the other, as Protext can not print down the paper in landscape form. Anyone who has a wide-carriage printer can copy the second section beside the first by using the Protext "box" marking facility.

Line drawing

When making a grid by line drawing, the natural way is to begin by drawing either the horizontal lines or the outside box shape and then adding the verticals afterwards. If you do it this way, however, you may find the vertical lines going slightly beyond the outside boundaries. To correct this, draw the uprights with the up or down arrow key, as normal, but use one of the horizontal, left or right, arrow keys for the final stroke before reaching the horizontal boundary. The line will then turn the corner to make a neat join instead of an intersection. Corners are drawn in the same way.

Although Protext comes with 48 printer drivers, there isn't one for the very popular Panasonic

KX-P1081 printer, which I use. The FX80 printer driver is suitable for it but will not print line drawings. So the function key strip needs to have the IBM9 printer driver loaded and one of the printer's tiny DIP switches changed. These can be found below and immediately to the right of the printer head when it is in its "home" position on the extreme left. Lift up the thin strip of clear plastic covering them and use a small screwdriver or similar implement to push switch number one, on the extreme left, down (for off). The other switches can probably be left as set but if you still have a problem try putting either switch six or seven up (for on).

Hopefully, Arnor will produce a key strip and their own official icons when the RISC-OS version of Protext finally appears.

Obvious when you know

Finally, a few brief tips of the "it's obvious when you know" variety. You can find your

version number of Protext by pressing <escape> and reading the bar above the command line. This also shows you the current directory and the selected printer driver.

The "Swap" line at the top of the colour configuration menu puzzled me for a time as it does not seem to be explained anywhere. I eventually discovered that selecting it and pressing <return> shows the colours used for alternate documents when more than one is loaded.

It is a good idea to lock the files of templates, such as letter headings, to prevent them being overwritten if a document you are working on is automatically saved with the template's name. If, for any reason, you cannot lock the template, load it with the command "m" for merge instead of "l" for load. The bar at the top of the screen will show "No file" and you will be asked for a name before the document is saved. A

Using a Second Floppy Drive

Tony Colombat

For those who have strived to purchase a wonderful and powerful computer such as the Archimedes, with only the minimum of memory and single floppy disc drive, it is soon apparent that to fully utilise fonts and several multi-tasking applications that expansion is desirable to overcome the need to constantly swap discs or copy !System and !Fonts onto numerous application discs. A second megabyte of memory at around £80 (from Archive) is certainly worthwhile and is easy to fit. This permits an increase in the number of applications to be installed on Icon Bar, but the disc swapping remains unless memory is traded for a RAM disc.

Hard disc versus Second drive

The purchase of a hard disc is the ultimate desire, and although the cost for hard discs is coming down, its purchase remains a considerable investment especially for an A3000. An alternative is to consider attaching a second drive which can store the main !System modules and

permit the reading BBC DFS or PC format files. This is especially an attractive proposition if you already have access to a 5½" 80 track double sided disc drive with power supply. If however, you have to purchase a drive then the £100 for a 5½" drive, or £138 for a 3½" drive might be better saved towards a hard disc. (*We still have a couple of 20M Oak A3000 drive available on special offer – see the back of the Price List for details. Ed.*)

External disc drive interface

To attach the drive to your Archimedes you will need to purchase a Disc Interface which is available from various manufacturers ranging from £12 to £50. I have not had any success with the £12 extension on any A3000 I have tried it with, so be prepared to pay around £30. It is also necessary to check that the interface you are about to purchase is suitable for your machine. My experience has been that the original A310 interface does not work with A400, and A3000 interfaces are different again. Do check carefully.

Using a second floppy

Remember that having added an interface and second drive, the Archimedes must be re-configured to utilise this drive with;

```
<f12>
* configure floppies 2 <Return>
```

followed by <Ctrl-Break>.

If any difficulty is experienced in accessing the internal floppy drive, then it may be necessary to open up the added drive and change the links from the "0" to "1" setting. Also, some of the interfaces have a number of link settings to aid configuration of the various drives, so read the instructions carefully.

Using a second drive

Some people express surprise to find out that a 5½" can format 5¼" discs to 800k capacity. This is so and I have not found new 5¼" discs fail any more regularly than ordinary 3½" discs. Older 5¼" discs will probably be all right, but I would treat them with more caution and check they are double sided and double density, i.e. DDDS. Providing these discs format without difficulty to 800k, I usually use these discs as a means of backing up my more important 3½" discs.

Use only one !System and !Fonts

Having formatted a 5¼" disc to 800k E format for speed, then copy the !System onto this disc. It will be necessary to check that the !System has within it all the modules for all the different applications which you possess and are probably on your separate applications discs.

Acorn have produced a useful utility called !Sys-Merge which will do all the hard work for you of transferring the latest version of modules onto your main !System. I believe this is available from SID or your local Acorn Dealer and hopefully may appear on a future Shareware/Careware disc? Once you are sure that you have your !System sorted out, the !Systems on your work discs can be deleted. Please note that I said "work discs" not the "originals".

!Fonts is more difficult as the original !Fonts supplied with the Archimedes has now been superseded with outline fonts as used by all the

DTP packages and many other applications. These later fonts require a new Font Manager and other modules. If you do not possess the new outline !Fonts then the easiest way to obtain them is to purchase a demonstration DTP disc as supplied by Beebug for "Ovation" or Clares "Tempest". An alternative way is to purchase such software as !Phases for £10 from North-West SEMERC which will also give you a cheap but effective DTP package with their version of the Trinity.Medium Font, or !Draw-Help at £16 from Sherston Software which comes with two outline fonts. Additional fonts can be purchased from a variety of sources, most notably Electronic Font Foundry. Longman Logotron are offering some 12 fancy fonts for £18. Beware, however, of purchasing fonts and then realising you are likely to purchase a more expensive DTP application which will supply !Fonts as part of the package.

Having obtained a number of fonts, these can be placed within the !Fonts directory. However, on an 800k floppy disc which also houses !System, only four families of fonts can be stored. I include the families of Trinity, Homerton and Corpus plus one fancy font. I find this is adequate for most DTP requirements but designing posters using fancy fonts requires more organisation. I am not sure that it is a good idea to add your printer driver to this main System Disc, as by now it is becoming crowded and some space is necessary to permit the correct transfer of data between multi-tasking applications.

Operating with the second drive

Having set up the System Disc, keep it in the second drive and, on starting up your machine, click on the second drive icon and then immediately close the viewer window. The Archimedes now knows where to find the !System and !Fonts so that other applications can be loaded as required. Without !System and !Fonts on each of your applications discs, more space is available for storing your files and far less disc swapping is required. A

Scan-Light Junior 256

Robert Chrismas

(It is convenient to talk about scanning 'pictures' but in this article 'pictures' includes cartoons, printed and written text.)

The Scan-Light 256 is a hand held grey scale scanner produced by Computer Concepts. The complete package costs about £260 and includes the MH 105AL scanner, an expansion board, a disk and two manuals.

The manuals

The Scan-Light Plus manual (34 A5 pages including index) deals with the Scan-Light software and the general principles of scanning. It also includes some excellent advice on getting the best out of your scanner.

The Scan-Light 256 manual (16 A5 pages) covers fitting the expansion board and details specific to the MH105AL 256 scanner.

Both manuals are clear and together they cover all you need to know to use the scanner successfully.

The scanner

The chief difference between this scanner and all the other hand held scanners I have seen is that this one can produce true grey scale scans.

Scanners which do not produce grey scale scans can still be used to reproduce pictures with grey scales. The scanner represents different shades of grey as patterns of black and white dots. This is called 'dithering'. Additional software, usually provided with the scanner, can then average the patterns of dots to produce grey scales. This is called 'sampling'. Since it takes a number of black and white dots to produce each grey scaled dot there is some loss of definition, but if the picture is also reduced in size, the result can look acceptably sharp.

The Scan-Light 256 can scan a strip up to 105 mm wide. The length of the strip depends on the memory available. It can be set to scan from 100 to 400 dots per inch.

Scanning modes

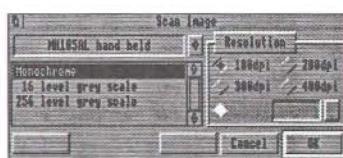
There are four scanning 'modes'.

The 'M' mode scans all shades as either black or white. It is useful for scanning text and black and white line drawings. Computer Concepts says 'M' stands for 'monochrome' – an unusual use of the word 'monochrome' which usually describes a picture with many different shades of the same colour. Strictly speaking, all the modes produce a 'monochrome' scan.

The 'D' mode produces a dithered image. This is how most hand held scanner represent greys. There is no reason to use this mode since the grey scale modes produce better results.

The '4' and '8' modes produce 16 and 256 grey scale images respectively.

The '8' mode is not able to use the full width of the scanner at 300 or 400 dots per inch. At 400 dots per inch it can only scan a strip 52mm wide.

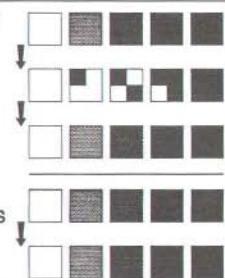


The Scan dialogue window

Quality of the image

For some pictures, the Scan-Light 256 does not produce better results than a cheaper 'dithering' scanner. Provided the resolution is the same, both types of scanner will produce identical results from black and white images. Pictures with

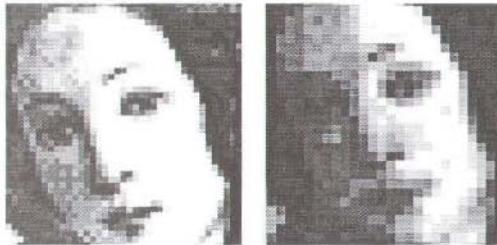
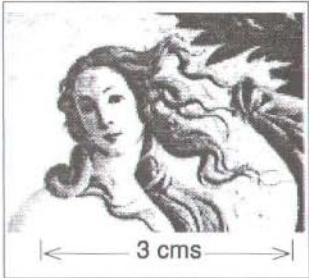
Most hand held scanners scan greys as dithered black and white dots. Sampling then converts back to grey scales.



The Scan-Light 256 scans greys as greys.

grey scales can be reproduced perfectly satisfactorily with a 'dithering scanner' if the size of the picture can be reduced significantly but the sampling values may have to be set more carefully.

For pictures with a wide range of grey scale which must be reproduced without significant reduction in size, the Scan-Light 256 produces significantly better results than comparable 'dithering scanners'.

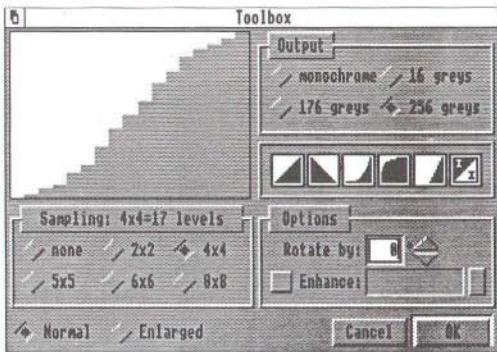


The picture on the left was produced with the Scan-Light 256, the picture on the right was produced with the Scan-Light Junior, a 400 DPI dithering hand held scanner.

The software

So far as I can tell, the software is common to all Scan-Light scanners.

Most scanned images benefit from some form of processing, even if only to crop the image. You often need to change the size and even grey scale images can benefit from sampling to increase the range of the grey scales. Despite the care you take in setting the brightness, the image may be too dark or too light or you may wish to increase or reduce the contrast.



The Computer Concepts software is easy to use and it offers a wide range of facilities. It allows repeated attempts at sampling a scanned image so you can alter the size of the sampling areas or adjust the number of grey scales in the 'output' sprite.

One of the most useful facilities is the ability to control the 'grey map'. When an image is sampled, a number is calculated which represents the average brightness of each small area of pixels. The grey map gives you complete control over the grey shades onto which these numbers are mapped. So you can easily change the contrast or make the whole picture lighter or darker. You could even invert the picture to produce a photographic negative effect.

The software also includes the facility to use this scanner and a Laser Direct printer as a kind of photocopier. I have not tested this.

Possible problems

To get the best results with a hand held scanner, you need a steady hand. Motor driven scanners remove this problem but most can only scan single sheets of paper so you cannot scan an image directly from a book.

All scanners suffer from patterning. Printed pictures which use grey scales or colours are made of patterns of tiny dots. These dot patterns can create interference patterns when they are scanned. The manual offers helpful advice for avoiding patterning. Incidentally, photographs do have continuous grey tones and the results of scanning photographs are usually excellent.



All the scanners I have seen seem to use a green light. Because of this, faces which have pink shades tend to become darker when they are scanned. Careful adjustment of the grey map usually corrects this.

If you have never fitted an extension board you may be a little hesitant about fitting. The whole job takes less than five minutes though this is assuming the computer has a backplane fitted – only A310's do not have one as standard. My worst problem was unplugging enough leads

from the back of my Archimedes to slide it out from under its shelf.

High resolution grey scale sprites need lots of memory, I would not recommend using this scanner with computers of less than 2Mbytes.

Conclusions

It is worth thinking about what you want to use a scanner for because you may find that a motor driven scanner (e.g. A4 Scan-Light Plus + Sheet-feeder, Archive price £434 + £107), or a cheaper 'dithering' scanner (e.g. Scan-Light Junior, Archive price £209 – but see below) meets your requirements more closely. If, like me, you want to be able to produce acceptable scans from a wide variety of types of picture this scanner is good value at an Archive price of £245.

This scanner is very versatile and it has produced excellent results with everything I have used it for so far. It seems to be reliable, it works as specified and the software which accompanies it is excellent.

(We have rather over-stocked on Scan-Light Juniors so we're selling them off (both A300/400 and A3000 versions) for £195 on a first-come-first-served basis. Ed.) A

PRES Disc Interface and DFS

Graham Evans & Tony Colombari

Somewhere along the line I ended up with two reviews of these products so I've started with the one that arrived first (Graham's) and then added extracts from Tony's where it added something to Graham's review.

The package under review consisted of two items which are available separately: PRES A3K6 (£48.95), a disc interface expansion card which allows up to three extra 3½" or 5¼" drives to be connected to an A3000 and PRES A3K12 (£19.95), a 65Host DFS and a DFS Filer which consists of a ROM and disc. The ROM is fitted to the A3K6 card so you cannot buy it separ-

ately. In my case, the ROM had already been fitted.

Fitting the card

The Disc Interface Card came with two pamphlets, one of eight A5 pages, the other a single sheet of A5 but the latter proved to be important during fitting. The card came with the standard warning about fitting and invalidating your warranty but I decided to try it myself.

The instructions were clear and concise and the fitting was straightforward. Bear in mind that this was only the second time I had opened the computer. After reassembling, I typed in *H. Modules as instructed in the manual and saw

that several new modules had been installed, including Drivelatch.

I connected my double, 5½" drives to the mains and the ribbon cable to the new connector at the back of my A3000 and typed in *CO. Floppies 3 and I had three floppy drive icons on the left hand side of the icon bar.

Two drives called 0?

I clicked on Drive 0 and was greeted by the error message 'Drive empty'. I tried the other drives but got the same message. I rang PRES who were most helpful. They explained that my double disc drives were set as 0 and 1, so the computer now thought I had two drives with the same name. I had to change the links on the drives. They explained what to do and it didn't seem too hard so I tried it. I opened the disc drives and looked for links with the numbers 0, 1, 2 or 3 by them. I soon found them and changed my drives to 1 and 2. Ready to try again!

Links on the interface board

The drives were reassembled and I tried again, but got the same error message. Another phone call to PRES and they suggested changing the links on the board. I referred to the single sheet of A5 – there were four links that could be changed. I opened the computer up again and, by following the instructions plus a bit of trial and error, I got the drives to work. I changed the setting on link 34 so that all drives give a ready signal and used link 4B which means that all external drive lights come on when any drive is accessed – but at least it works!

The good news

The Drivelatch module allows any drive to be configured as Drive 0. The default is Drivelatch 0123 8. Eight meaning 80 track, the other numbers referring to drive numbers. Typing *CO. Drivelatch 2 0 1 would have the effect of configuring Drive 2 as 0, Drive 0 as 1 and Drive 1 as 2. This would be useful for running discs that have to be in Drive 0, but there are numerous possibilities for this feature. The double stepping features are implemented by adding 4 after the drive numbers and this worked very well. The

manual explains the many possibilities of these features.

A3K12 and DFS software

This comes as a ROM and a disc but it was already fitted to the card I had – thank goodness! The disc had version 1.04 of !65Host and !DFS-Filer on it. I also used version 1.06, the most recent, but could not see any differences.

The DFSFiler is multitasking and is very good. It allows you to drag part or all of a DFS disc to an ADFS disc and the whole process takes seconds. I also dragged View files directly into Pipe-Dream.

The Filer assigns programs with the appropriate SETTYPE code so that the various parts of a program do not appear as little white squares. There were occasions when this did not work but I prefer this method to leaving the programs blank and expecting me to *SETTYPE each square.

!65Host starter

This provides a 65Host icon on the right hand side of the icon bar, initially it will be grey. Opening a directory viewer with !65Host changes the colour, clicking on the icon provides a full DFS on DFS Drive 0 – in my case with three drives it was Drive 2 but with two drives it would be Drive 1. If you are not happy with this arrangement you can assign DFS Drive 0 to any of the drives with a simple * command. Double stepping is available within the DFS by typing *STEP40.

Running BBC software

Having my Drive 2 as DFS Drive 0 worked very well. The majority of software I use in the primary school where I teach runs including 4Matlon and Sherston software. I also loaded in ROM images such as Logo, Edward and View using the *SRLOAD command and all the programs could be loaded from <shift-break> as on the BBC.

Conclusion

The Disc Interface Expansion Card seems sturdy and easily fitted. Had I any prior knowledge of disc drives being assigned numbers, I could have

saved a lot of problems for myself. Also, if the possibility of having to change the links on the interface card had been documented, I would again have saved time and effort. If in doubt, have it fitted by a dealer but don't forget to get them to check the settings on the additional disc drives. The Drivelatch module is extremely useful as is the double stepping feature and I would not like to be without it for lots of reasons.

The !65Host and DFS Filer were most welcome. I can run most of my school software and the method of loading the program is identical to that used in school i.e. <shift-break>.

The Filer is very good – dragging View files into Pipedream and seeing the text exactly as it was, is quite a relief! I was also pleasantly surprised that I could convert a lot of programs to 3½" ADFS by simply dragging them over. Both items are well worth the money but remember that you cannot use the DFS ROM unless you have the board fitted.

(Caution – I wanted to have an internal IDE hard drive fitted but, with the PRES interface fitted, there is no room.)

And now, here are some comments from Tony Colombar....

Using the interface

The interface may be used to access an extra 800k drive whether this be 5¼" or 3½". This is very useful for those without a hard disc and warrants an article in itself. (*See the separate article written by Tony on page 23.*) However for many educationally/business institutions, the value of the attachment of a 5¼" drive is to enable them to read BBC B DFS or PC discs and transfer their files to Archimedes ADFS format. Any public domain software such as the DFS reader supplied by NCS (Shareware 2 or 31) or !PCDir (Careware 7) can be used to transfer files. Here, however, a word of warning, for I have yet to find PD software which reads 40 track discs correctly. Even if the drive is a switchable 40 track, or if the PRES DriveLatch command is used – the disc is not read. The moral appears to be, ensure the files are on an 80

track disc or order PRES DFSFiler software which will read 40 track DFS discs correctly. (– *not all 40 track discs, in our experience. Ed.*)

The DFSfiler software

..... The limitation of the software is that discs can only be read, and not written to, so if you wish to swap a file from ADFS to DFS format this is not possible. To achieve this transfer, the ArcDFS software from Dabs Press would be more useful.

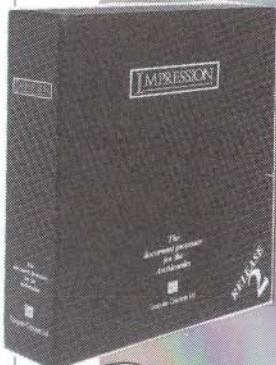
With the new ROM fitted to the disc interface card, then on starting up the computer, a greyed out BBC Icon appears on the right side of the icon bar. This turns to its correct colours when the !65Host is spotted. From now on, clicking on this icon will run the !65Host and the BBC Emulator takes over the A3000. The claim from PRES is that protected software may now be run on the A3000. Certainly my attempts at running some old protected BBC "B" games did work without problem. I did experience two difficulties, however. The first was that 40 track software would not work without using the BBC Master command "*drive 0 40". This was despite using a switchable 40/80 track drive and the DriveLatch command to force double stepping. Only the above command would work. Pressing <Break> resulted in having to retype the command and so discs could not be started with <Shift-Break>. The second problem was that I could not write to a disc and therefore the ability of using BBC "B" original software which must write to a disc at any time under the emulator was lost.

Conclusion

At over £50 the disc interface buffer appears expensive but it is very well made. For those people who wish to use their old BBC Software then the DFSfiler at over just £20 enhances the interface bearing in mind the limitations mentioned. I have used the interface and software a great deal and found it far more reliable than other such similar interfaces so I feel I can recommend it.

PRES A3000 Disc Interface £48.95 + VAT and PRES DFSfiler £19.95+VAT. A

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Multi-Media Column

Ian Lynch

The first thing I would like to do in this month's column is correct a mistake in last month's piece about Avanti. The price of Avanti to non-education users is £2,150 not £5,000 as I stated. The £5,000 figure is the price for Authorware Professional on a Mac, but even this may have been revised recently. My apologies to Westland.

While on the subject of Avanti, I have been invited to Westland to have a more detailed look at the product and so I should be able to give you some ideas about its potential next month.

The Multi-Media Show

The Multi-Media Show was a little disappointing in that most of the offerings were very similar to each other. The main thing which struck me about the show as a whole was the increasing presence of Unix and X-windows.

One of the multi-media "buzz words" is "participative" activities and these are supposed to make the user participate with the application rather than simply interact by giving simple responses to options. I suppose virtual reality is the ultimate participation. I did not see much participation at Olympia – just the same tired salesmen trying to catch the eyes of prospective customers with some flashy animations.

High quality video in a window

Every stand seemed to have a Unix X-Server running live video in a window with the ability to digitise frames and resize the windows distorting the image. On Sun's stand I asked one of the demonstrators about the product and he said that it involved adding a special interface which did most of the work and so the machine's processor was relatively free to do other things. The price? £8,000. "Not my most immediate priority for an add-on", thinks Ian. The system should be portable to the R260 but when I went onto Acorn's stand I was in for a pleasant surprise. Jim Irlam of Irlam Instruments had what looked like an identical system running in a RISC-OS window.

"Should be able to retail at about the £1000 mark", says Jim.

Without a detailed review, it is difficult to make comparisons but this strikes me as another example of non-Archimedes users having to "pay through the nose" for their add-ons. Well, such is life.

So what good is live video in a window? First, I must point out that the quality of the image is superb and far better than the usual digitiser images one usually sees. Secondly, it would be possible to run the video and sequence other applications in other windows around it since, unless the window is rescaled, the ARM is free from any overheads in displaying the pictures. This is just another step towards the integration of video technology and computer graphics applications at steadily lower prices.

Colour scanning

Another interesting new item from Irlam is an A4 colour scanner. This is a Sharp device like their A6 scanner and produces higher quality pictures more quickly. Clares also produce an A4 scanner based on Epson technology and rumour has it that Iota are working in this direction too. All these scanners are expensive (around £2,000) but they can produce 24 bit colour images which means that each of red, green and blue has 255 possible levels giving umpteen million possible shades instead of being restricted to 64 colours each with 4 levels of tint as is the case with the current RISC-OS display. If the Archimedes is to compete with the Mac and high-end PCs in applications involving colour graphics, some inexpensive solutions to the Archimedes' rather limited (by current standards) graphics capability will be needed.

At this point, you may be wondering why companies are producing 24 bit scanners for a computer with an 8 bit display. Perhaps they know of developments we don't, but in any case, obtaining a best fit 8 bit image from 24 bit data gener-

ally gives better results than trying to match 8 bit data to 8 bit data. ChangeFSI and Translator both do a good job of converting 24 bit data to 8 bit images.

Colour scanning and digitising is becoming increasingly important in presentation applications which make use of still and animated graphics.

Eidos

Another interesting development on the Acorn stand was the Eidos project – a video editing system which digitises and compresses video, storing 25 frames a second onto an optical drive. Any particular frame can be retrieved in under a second with any amount of the recording cut and pasted between windows rather like a word-processor but using video frames. Over an hour of video can be saved to a single removable disc.

Eidos will be of use primarily as an off-line system which can be used to experiment and quickly version a final film. The film on tape can then be run and edited on the basis of the digital version. Unfortunately, the quality of the pictures after being digitised and compressed is not

high enough to use Eidos as a direct method of editing video – well, not yet. The principle is, however, established and all that is needed is more processing speed and greater storage in order to make broadcast quality editing a reality.

New names

I now read that multi-media should be referred to as integrated media. I suppose that a system which supports audio, video, text etc is multi-media even if the various applications run separately. Integrating the media is probably a better description of how to make a machine with multi-media capability really useful. The key to doing this is through software, and RISC-OS provides many advantages which make life easier for the media integrationists.

Next month, I will be able to give a much better account of Avanti and I have been trying to contact Logotron about Magpie. I will also get back to Genesis II and explain some of the script language. Please write in if you have any views. If you don't, I will have to just follow the lines which interest me! A

Language Column

David Wild

It is interesting to see that the debate about 'C' is springing up again in some of the American magazines such as Byte. The June issue had a letter claiming that difficulties with the language were at the bottom of some of the famous debacles such as the original version of dBASE IV and release r of Lotus 123.

At the same time, Paul has passed on to me a letter complaining about an article in Archive 4.9 p32 which appeared to press the claims of Basic as against 'C'. In the letter was the phrase "anti 'C' bigots" but, to be fair to the writer, he did refer to "pro 'C' bigots" further down.

As regular readers will know, I am not enthusiastic about 'C' but I would like to make it clear what the case against the language is. It is not that 'C' cannot be made to do things; the work of David Pilling and Hugo Fiennes shows that

very good work can be done by dedicated programmers. The complaint is that you need to be a very good programmer to be able to use it properly. This is because of the flexibility that is, rightly, seen as one of the main advantages of the language.

I feel that an appropriate analogy is with the activities of Motor Rally drivers. They can do all sorts of things with high-powered sports cars; including turning them over at high speeds and walking away from the wreckage. The fact that they can do this doesn't mean that their sort of car, and driving, is suitable for the majority of drivers that use the ordinary roads.

A language as flexible, and with as few restraints, as 'C' needs very careful checking; and my own experience together with that of reviewers in both Archimedes and PC magazines tends to suggest that checking of programs is often

very much neglected. It is tedious work whereas writing programs is very much more interesting.

There was an article related to this in the July issue of "Computer Shopper" where the writer complained of the uselessness of Beta testing. His complaint is that the testers don't dare to let ordinary users get at the programs or dare to use it on the data that matters to their company. This tends to mean that one or two interesting bits are looked at, but it doesn't get the sort of test that matters.

This problem applies to programming in all languages but my feeling is that, in an ideal world, a programmer wouldn't be allowed a 'C' licence until he or she had proved his commitment to proper testing and checking of all programs.

I recently visited the Unix Show at Olympia and was given a copy of an American magazine called "Computer Language" which I found to be very interesting, but I'm not sure how it can be purchased in this country. An amusing touch is that two of the main articles in the June issue

are "How to reverse engineer" and "Protect your code from Hackers". I don't know if the authors have read one another's work.

!Charm

I have just received an updated disk from David Pilling with the latest version of this interesting language. Peter Nowosad, the author of the program, has produced a tutorial which makes access to the language very much easier. At only £5.99 it is very well worth buying.

Smalltalk

At last there is an advertisement for Smalltalk for the Archimedes, but I'm afraid that most of us will not be trying it for some time yet because the price, in the August "Acorn User" is £795 + VAT! The advertisers, IDEA/Magrathia of 6, Falcon View, Winchester SO22 4EP mention educational discounts, so it might be a reasonable proposition for a university or college. I shall be asking them for more details when I come back from holiday at the beginning of August. A

Small Ads

- **2nd internal drive** and front panel for A310 £60, and a Roland MT-32 multi timbre sound module £250. Contact John on 0902-674672.
- **600 dpi laser printing service** offered by North Norfolk Computer Club. Phone Roy for details on 0263-70-669.
- **A310** with Acorn 20M drive £550. RISC-OS P.R.M. £69. ANSI C rel 3 £99. Citizen laser printer £350. Phone 0256-892008.
- **Beebug Scavenger** scanner with sheet feeder £150. Panasonic KX-P3131U daisy wheel printer £60. Psion Organiser XM £45, Acorn DTP £25, Atelier £15, System Delta Plus £10, The Real McCoy £10, Ibix the Viking £10, Inertia £5. Phone John on 0483-502507.
- **Brother HR-15** daisywheel printer with 3 wheels + ribbons £200, Interword £15, Inter-sheet £15, Interchart £10, Spellmaster £25, all original on disc for Archimedes. Phone William on 081-989-2666.
- **Computerware hard disk podule**, Atomwide 4-slot backplane with fan, Acorn 2nd Floppy drive upgrade for 300 series, and a Morley Teletext decoder for Archimedes with optional power supply for sale. Offers to Chris Walker on 0953-604255.
- **Digitiser** – Pineapple extended colour version, 16 bits per pixel, 512x256 pixels, full width podule. Cost £362, as new, sell for £225. Phone Ned Abell 029922-249.
- **Epson LQ1060** wide carriage 24 pin + Ace RISC-OS colour printer driver. Parallel & serial interfaces. Offers please. Phone 081-642-3012.
- **Free to anyone who can collect them** – various issues of A & B Computing, Micro User, Acorn User and Your Computer (1982 to 1990 about 80 issues in total). Michael Porter, 6 Summer Road, Thames Ditton, Surrey. Phone 081-398-6401.

- **Genlock** – Arvis videocontroller podule without plug-in encoder board so takes RGB out and in. As new, cost £339, sell for £215. Phone Ned Abell 029922-249.
- **Oak SCSI 70Mb hard disc** with interface card £450 o.n.o. Phone 0276-20575 after 6 p.m.
- **Plymouth User Group.** Anybody interested in forming and A3000 or Archimedes user group in the Plymouth area? If so please send an SAE to David Heath, 26 Luxmore Close, Leigham, Plymouth, Devon, PL6 8NX.
- **Presenter II** with hot links £30 (unregistered), Flying Start II £15 (unregistered), Genesis £35 (unused), PC Emulator (MS-DOS) £40. Phone Mr Thompson on 0332-701969.
- **SF & Fantasy PD.** 4M of data on 3 discs £4. David Jones, 160 Hazelwood Drive, St Albans, Herts AL4 0UZ.
- **System Delta +** £30, Atelier £45, Artisan 2 £25, Impression Junior £50, Schema £65, Orrery

£55, WorraCAD £50, Poster £50, GraphBox £40, GammaPlot £25, Watford 400 dpi hand scanner £75, Watford video digitiser Mk 2 £125, Morley 1Mbyte RAM (A3000) £50. All perfect. Phone 09274-20651.

Charity Sales – The following items are available for sale in aid of charity. PLEASE do not just send money – ring us on 0603-766592 to check if the items are still available. Thank you.

(If you have unwanted software or hardware for Archimedes computers, please send it in to the Archive office. If you have larger items where post would be expensive, just send us details of the item(s) and how the purchaser can get hold of them.)

User Guides £1 + £3 postage, Herewith the Clues £8, Apocalypse £12, ArcWriter £3, PC Emulator 1.34 (not upgradable) £25, Serial Interface/buffer for Epson FX80 £12, Arcscan 2 £4, InterWord (Disc) £15, AlphaBase £18, Revelation £35. **A**

Tracer – A First View

Ian O'Hara

We are giving Ian a chance to "have a go" at Tracer and then Ian Lynch is going to act as referee – see the following article. Ed.

One of my main uses for my computer is to produce worksheets for school. These need pictures and so I purchased a scanner. Fine, except for the fact that bit-mapped graphics tend to use up vast amounts of memory. Even 4Mb isn't so large once one starts using 300-400k sprites. The answer to this was Draw files. The problem then is how to convert sprites into Draw files. One simple solution is to hand trace the sprites but hand tracing is slow and tedious. Spending a whole evening hand tracing sprites for a worksheet is marginally more interesting than watching paint dry.

At the Acorn User show last Autumn, I thought I had found the answer to all my prayers. Midnight Graphics were demonstrating a new program called Tracer which would do the work for

me. I was told it was only in the development stages, but it looked very impressive. After various pestering phone calls, I was finally told it would be available at BETT. Along to BETT I went, official order clutched in my sweaty palm. A demonstration was asked for and given. The program did all the things asked of it. There was no manual available at that stage, but I was told that it was so simple I didn't need one. I parted with the school's cash and took a copy home.

The application was very easy to start. I simply double clicked on it and it sat happily on the icon bar. Now to test it. Sprites are loaded by dragging them onto the icon. Two windows opened, one for the sprite and the other for the Drawfile-to-be. I remembered being told that Tracer would only automatically trace monochrome images (that means just black and white, no greys or anything else), so I loaded Paint and drew a black box and a few black lines. Tracer made a real mess of these. There were no right

angles in the place. Time to try and remember what the various options were.

The tracing is controlled by various parameters which can set and altered. These are:-

- 1) Sample rate – determines how close the trace will follow the border of the sprite.
- 2) Close – the distance between control points. The smaller the value, the more closely it will follow kinky lines.
- 3) Smooth – changes the angle at which tracer will smooth the joining of two lines to make a smooth curve.
- 4) Passes – the number of times Tracer will go over a sprite. The greater the number, the more detail is picked up.

I changed these but never got Tracer to turn a sprite box into a draw box. A simple shape and yet it couldn't do it. I quote from the manual "One noticeable 'feature' of Tracer is that it does not appear to perform very well on the corners of rectangles." I haven't found it too good with straight lines either.

So it didn't like boxes. The next task I gave it was tracing a mode 15 sprite of a care bear. I was told it would trace coloured sprites, but they had to be done manually. This simply involves clicking on a coloured area and just that area is traced. The computer was in mode 15 and I dragged the sprite into Tracer. Tracer decided it didn't like the colours and changed them. It appears that Tracer will only accept the standard 16 colour desktop palette. As yet, I have not found anything in the manual to tell me how to get real colours. Another bad start, but at least the sprite had plenty of curves.

I clicked on the bear and Tracer went to work. The outline looked reasonable. Next the sky and again Tracer went to work. Problem. The two boundaries didn't match and there were many large white gaps. OK, so the manual tells me that the Draw files may need cleaning up, but what is the point when the cleaning up takes longer than tracing the whole thing by hand in the first place?

Tracer does have facilities to turn coloured and grey-scale sprites into black and white images for automatic tracing. It even has a clean option which removes odd pixels which cause noise and complicate tracing.

Just before Easter, I received the latest version of Tracer and the manual. There was no appreciable difference in the results produced by the two versions I have had. Having the manual was nice as it told me what the various options meant and it admitted that the program did not always do a perfect job by suggesting that one might need to take the file into Draw to clean it up.

Tracer will cope with very complex black and white sprites quite well. I traced some sprites from one of Beebug's PD discs. These consisted of images that looked as though they had been scanned from a book on D&D. The results were very good and I would never have attempted to trace such sprites by hand. Unfortunately, the Draw files produced by this were larger than the original bitmaps which isn't too helpful!

I find it very difficult to recommend this package in the way some of the magazines have done. The task it has to perform is not easy but for £50 or so I would have expected it to perform considerably better. **A**

I'm never too keen to publish uncomplimentary reviews, but the first person to whom we sent Tracer for review said they didn't want to review it as they didn't like to appear too negative.

I mentioned this fact last month and that Midnight Graphics (Dabhand Computing) said they had not had a single negative comment from any of the over 600 users of Tracer. I asked for comments from readers and got about a dozen letters all of which made mentions of the limitations of Tracer and some of which said that what it does it does well enough. (Also, many of them said that DrawPlus (Careware 13) was a boon in touching up Tracer's output.) So I passed the letters on to Ian Lynch to act as referee. His comments follow. Ed.

Tracer – An Overview

Ian Lynch

Because of all the controversy over Midnight Tracer, I volunteered to look at the letters that had been sent to Paul and then to use that information, in conjunction with my own experience of the package, to clarify certain points.

The manual

The manual I received certainly is not very professionally turned out. The statement that it was printed at 600 dpi on a LaserDirect was laughable – not to say that I disbelieve it, but the photocopying of the laser copy has completely negated any advantage of hi-res printing. Also the paper quality is not sufficient for this type of document. There are 6 sheets in the manual and using high grade paper such as Mellotex should not have increased the price significantly. In fact, on a run of 600 it would almost be feasible to simply print the whole lot on the laser printer if decent copying facilities were not available!

The content of the manual is reasonable and explains the procedures quite well. Owing to the variability of results, more comment on limitations would have been useful. The process of converting sprites to vector graphics is certainly not trivial and there are control procedures involved which, despite being reasonably well explained, require a lot of time and practice to make the adjustments needed to get the best results.

Sometimes, good results are just not achievable (I think) and in this situation the user goes through self-doubt wondering whether it is the software or lack of aptitude which is the problem. In one sense, the software and documentation is at fault if this situation arises. On modern computer systems, the user interface and documentation should be good enough for an average user to obtain satisfactory results without devoting the rest of his life to the task. On the other hand, there are some applications which are complex and will take some learning. A beginner would be unwise to buy ANSI C and expect to have it mastered in an evening. Tracer

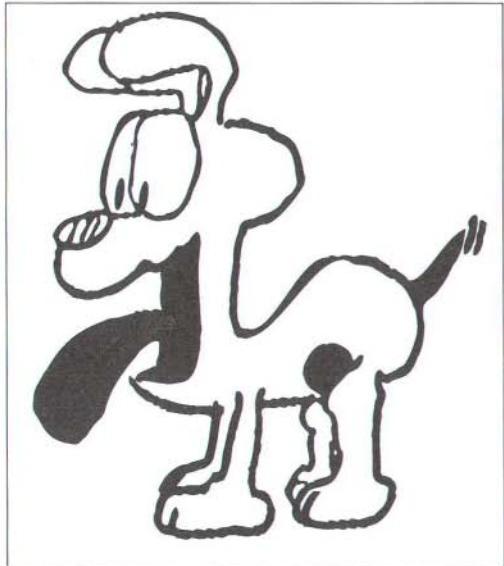
is an inbetween product and it is not primarily the content of the manual that is at fault or the user interface, but the fact that Tracer is better on some subject matter than others which is confusing to a new user.

The program

This brings me to the software itself. There have been a lot of complaints about Tracer not being able to do what is claimed. Tracer does indeed convert sprites into drawfiles and manages to do so quite quickly and painlessly. I have found the best results with simple line art of the type found in children's comics. I have provided some examples of drawfiles produced from images which originated using Scanlight Plus. These were considerably reduced in the data space taken up and allowed flood fills of some areas and other manipulation. I also scanned my signature and turned it into a satisfactory drawfile.

Where I found Tracer pretty useless was in converting large complex images with lots of halftoning. Tracer actually made a reasonable attempt at some of these, but there were so many





objects in the resulting picture that it was virtually impossible to do anything with it. Further, some very complicated sprites can generate drawfiles which are nearly as data intensive as the original image. In fact, I have reports of drawfiles which were bigger than the original though I haven't produced any myself. In conclusion, I have to say that I do find Tracer useful in some areas of work, but I would only recommend it to people who have a clear idea of what they are trying to achieve and a clear idea of what Tracer can and can not do well.

Price

The final thing is price. A number of people have complained that Tracer is too expensive. I think we have to appreciate the difficulties suppliers have in pricing products, when they are unsure of sales figures, but if we are to believe 600 sales at, say, £30 to the company it only results in £18,000 of revenue to pay for distribution, advertising, the programmer etc. Tracer is 26k long and development costs can be as high as £1 a byte depending on the method of writing. In the Archimedes market, Tracer is quite expensive for what it does, but currently it has no competition – another factor which determines

price. Certainly, at the price, I do not think that there is any excuse for a shoddy manual or disc labelling that looks rather amateurish. Hindsight is a wonderful thing, but suppliers need to be sensitive to customers and should appreciate that many will take "turns sprites into drawfiles" to mean that a sprite will become like the high quality clip art they are used to. I do think there is some onus on the buyers to be careful about their interpretation of advertising claims though I have found some companies under-state their products.

Conclusion

I hope I have been fair to all concerned. Midnight Graphics need to consider customer needs and aspirations more, particularly with applications where the functionality can be interpreted differently. I am pretty sure that they have released Tracer in good faith though a little market research and "beta testing" on non-experts would help prevent these problems. Disappointed purchasers should perhaps try and find local suppliers who will let them try things out before buying, particularly if they are in any doubt about their understanding of a product. Given that Tracer is not copy protected it is perhaps unfair to expect a money back guarantee to dissatisfied customers as operated by Computer Concepts. A



Competition Corner

I have caught Colin out this month by going to press early because of my trip to the States, so this month's competition is set by me – so it's a silly one.

What you have to do is tell me what Schroeder (if that's the correct spelling) is saying in the picture at bottom right of the opposite page. Answers on a postcard, please! A

Eizo Flexscan 9080i Monitor

Martin Thorpe GL Consulting Ltd

We don't normally allow people to review their own products but in this case, Martin is reviewing the monitor and, since his product, OutLook, is what makes the monitor usable on the Archimedes, it seems natural for him to mention it!

This article contains a review of the Eizo Flexscan 9080i monitor, and gives more detailed information about the OutLook package provided by GL Consulting, which we recommend for usage with the 9080i.

The Eizo Flexscan 9080i Monitor is a 16" auto-scanning colour monitor with a number of features that set it apart from its counterpart, the 9070SZ. The monitor has a micro-processor controlled screen adjustment and a horizontal scanning range of 30kHz to 64kHz.

First Impressions

The first thing that you notice about the 9080i is its size. Closer inspection reveals the micro-processor control panel below the display. This panel controls the screen adjustments, the picture input and colour, and brightness and contrast.

The panel has 6 LEDs and 2 push buttons. In any screen mode, if the monitor can synchronise to the output signal, the green sync LED lights and the display appears.

Pressing the Select control button turns on the yellow horizontal position LED, inviting you to use the adjustment wheel to move the picture. Pressing Enter confirms the adjustment. Further presses of Select allow you to adjust the vertical position, the horizontal and vertical sizes, and the pin-cushion distortion control. All the adjust-

ments are stored in non-volatile RAM inside the monitor.

The monitor has two sets of inputs. It has a D-Sub 9-pin input, which connects to the Analogue RGB output on the back of the Archimedes. The cable supplied is a high-density VGA cable, which is not suitable. The correct cable to use is the Eizo MD-C18.

In addition to the D-Sub connector, five BNC inputs are provided. These are used by the Archimedes to display high-resolution monochrome modes such as 23 and 48 (1280 x 960, provided by OutLook) in their full splendour. The Mono output on the back of the Archimedes should be connected to one of Red, Green or Blue, depending on your personal preference, and the sync output should be connected to the X (Composite) sync input. To display these modes, the input selector should be set to BNC and the colour selector should be switched to B/W.

In both cases, the Archimedes sync output should be set to Composite.

The quality of the display is truly amazing. The screen is rock-steady and, should the display be slightly blurred, it can be focussed using the screw on the back panel. Normally, you should be able to set up and focus the monitor and then leave it.

OutLook

In order to provide support for higher resolution monitors such as the Eizo 9080i and to enable the usage of even higher resolutions on A400 and 500 series Archimedes, we have developed OutLook. This package provides support for Super VGA (800 x 600), 8514/A (1024 x sim-

ulated 768), 800 x 480, 1152 x 448 and 1280 x 960 monochrome modes on any Archimedes with enough memory and a VIDC Enhancer, including the A540. In addition, the VGA clock of the A540 is fully utilised to provide a true VGA output. OutLook consists of a customised module for your monitor and a WIMP front end, allowing the actions of OutLook to be controlled. In addition, any mode may be selected from an informative list and the pixel and OS-Unit

resolutions, number of colours, memory requirement, and screen and pixel frequencies of any mode may be requested.

(OutLook is available from GL Consulting at a price of £10. Site licenses are also available.)

If anyone is interested, we can get the 9080i as we now buy direct from Eizo UK! It costs £1050 (list price £1099 +VAT = £1291) through Archive. A

Iron Lord

Richard Forster

Iron Lord is one of the most delightful games I have played on the Archimedes. It has plenty of well detailed and colourful pictures, several atmospheric tunes and a general highly polished feel to it. What is more, it manages to mix a variety of different game styles from arcade to adventure and strategy. The game is easy to load and installs onto hard disc without any problem. Even the manual is well done, with an eight page introductory tale preceding fourteen clear, yet detailed, pages of instructions.

You take the part of Iron Lord, a Crusader of Justice, who escaped a massacre as a baby, during which his father, the King, was killed by his evil uncle. After many years of being brought up in hiding, you have now returned to the land to overthrow the oppression and injustice, and to return it to the serene kingdom it once was.

The first part of the game has you wandering in search of armies so that you can fight the forces of darkness, and is a public relations exercise to get the people on your side. You begin the game with an overview of the kingdom and a medieval tune. To move to one of the seven locations you click on it and, as long as it is accessible from your present position, you will be moved to it, accompanied by a small picture of yourself riding towards it which moves along the screen, following the route you travel.

When you get to your destination, the screen changes to display a picture of the village etc

where you are and a map at the top right, above a text information screen. You can then move around this map using keys or mouse until you encounter a building of interest, which you can then enter. This was perhaps the only weak area in the game, as there was no clear way of knowing which buildings could be entered despite the information which would appear in the text.

Once inside, a picture of the inhabitant usually appears, and this is accompanied by a different piece of music for each person. You then have various options, from trading to talking. To talk, you simply cycle through a list of conversation topics until you get the right one, then click on it. Information gained in one part of the game usually adds new topics, so for example, having been told by an irate farmer that he has not been paid by a local innkeeper you can then go to the inn and ask the innkeeper why.

Most people want something and, upon receiving it, usually become more helpful, but the problem is that some of the things people want are not easily accessible. Most are held by other characters (who generally want something first), but a few can be gained by completion of the 'action' sequences. These include arm wrestling, an event that involves quick movement of the mouse and is exhausting, to several sword fights. There is also gambling to be done (with an excellent sampled die roll), and an archery contest. The archery relies on setting angles for varying targets and is exceedingly difficult for the first

few times, although it becomes possible after a couple of hours practice.

Once you have gained the support of at least one band of people, you can set off into the final battle. It is not advisable to go into battle without all the possible groups because, even with them all, it is quite difficult to win, and the enemy always starts with ten. The battle itself is purely strategical, and involves programming your troops to move around the battlefield. Once two enemy regiments move into each other, a battle commences, the outcome of which depends on the amount of energy each has and also the number of men, as well as points like whether an enemy was surprised by being attacked from behind.

It took me quite a few goes to get past this stage, even with all ten available troops and, somehow, whenever I was attacked, the enemy always seemed stronger. However, after trying out various plans, I eventually found one that won though and was rewarded by the final challenge of the game – the labyrinth.

The labyrinth part of the game has six levels, each of which in two stages. The first stage is a

maze through which you move trying to find various objects, opening doors and locating the entrance to the next level. Once you have found the entrance, you must do an arcade phase which is rather like space invaders, and then it's onto the next level. Unfortunately, I have not got to the final level because there is a time limit on this part of the game and it is amazingly easy to get lost and watch the time drain away. Fortunately, the game allows you to save before you enter the labyrinth and so with a bit more persistence . . .

Overall, the game is well worth buying and there is plenty in it to keep you occupied for a good while, wherever your gaming interests lie. The nature of the game is such that you can solve it from various different angles and, if you find a particular section too hard, you can easily leave it to try for a different area first and, when you do finally complete something, you can always save the game so that you do not have to do it again if Iron Lord succumbs to the unknown.

'Iron Lord' is available from Cygnus Software or through Archive at £18. A

Archive Mugs for Sale!

Now that we have got the Archive mugs back from the manufacturers, I can report that they really are rather attractive. If you imagine the top couple of inches of the front cover (but without the date, issue number and price!) in blue and black on a white mug, you will get the picture of what the new Archive mugs look like.

I was hoping that someone would write in saying how nice they were so I could give an unsolicited testimonial but no such luck. All I can do is offer a money-back guarantee if you are not absolutely satisfied.

£3 each (+ £1 p&p) or four for £10 (+ £2 p&p)

(We normally quote prices inclusive of p&p but in this case it is such a large proportion of the cost, I think it's better to see it separately.)

Why not pop into the Archive office and pick up some mugs? – It saves you the postage!

In Search of Euler's Constant

George McCavitt

The January Competition Corner was to generate and display an arbitrary number of decimal places for e , Euler's Constant. I used a Continued Fraction to represent e as a vulgar fraction instead. I have adopted the convention where the partial quotients are displayed as $[a_0; a_1, a_2, a_3, \dots a_n]$; the semicolon separates the integer part of the fraction from the rest. It is quite clever that such a list will regenerate both the numerator and denominator.

A Simple Example

If you have access to a scientific calculator, or use !SciCalc (Shareware 19), you can try the following simple example:

Select $\pi = 3.141592653583238462643383279$, to the accuracy of your calculator.

Record and remove the integer part.

Take the reciprocal of the remaining fraction.

Repeat the last two stages for about five iterations.

The continued fraction for π is determined from the integer parts you discarded, which should be something like $[3; 7, 15, 1, 292, \dots]$. You will see how this is used later on.

Surds can be shown to have a repeating part in their partial quotients, which doesn't terminate; they are infinite continued fractions. The simplest is the square root of 2:

$$\text{SQR}(2) = [1; 2, 2, 2, 2, 2, \dots].$$

Taking eleven partial quotients gets me to the accuracy of my 12-digit calculator, and this surd is a slow grower. Try it. Enter 2, take its reciprocal; add 2 and take the reciprocal of this sum; repeat the last until bored and then add 1.

Calculating Convergents

Luckily, to condense such a continued fraction back into a conventional fraction (p/q), there is no need to solve from the right. This handling of reciprocals can be avoided using the equations:

$$p_0 = a_0 \quad q_0 = 1$$

$$p_1 = a_1 a_0 + 1 \quad q_1 = a_1$$

$$p_k = a_k p_{k-1} + p_{k-2} \quad q_k = a_k q_{k-1} + q_{k-2},$$

both p_k and q_k use the same iterative formula but with different starting conditions. Only one final division is necessary to form a decimal fraction.

Proof of the Pudding (or Pi)

Using p_k / q_k for π from the above example, we get successive values of $3/1, 22/7, 333/106, 355/113$, with decimal values of $3, 3.14, 3.1415, 3.141593$.

The next value on is a better approximation to the true value. Check that $355/113$ is vastly superior to using $22/7$ as a rational approximation to π .

Back to Euler

e is known as the sum:

$$1 + 1/2! + 1/3! + 1/4! + \dots$$

but Euler also gave it as a continued fraction $[2; 1, 2, 1, 1, 4, 1, 1, 6, 1, 1, 8, \dots]$. This recurring pattern can be used in an algorithm. In Elementary Number Theory by D. M. Burton, Euler gave $(e-1)/(e+1)$ as $[0; 2, 6, 10, 14, 18, \dots]$. Using this gives e more quickly. The following table and equations should explain how:

n	1	2	3	4	5	6
a_n	0	2	6	10	14	18
p_n	0	1	6	61	860	17341
q_n	1	2	13	132	1861	35298
$p_n + q_n$	1	3	19	193	2721	49171
$q_n - p_n$	1	1	7	71	1001	18089

Noting $(e-1)/(e+1)=p/q$, therefore $e=(p+q)/(p-q)$

so e can be condensed from the last two rows as:

1, 3, 2.7, 2.718, 2.718282 and 2.71828183.

Continued Fraction Procedure Description

As 32-bit arithmetic can only offer 10 decimal places of accuracy, an alternative is needed for greater precision. A byte per digit would need several lines of Basic. I instead chose to use the built-in features of arrays. I use three, $A\%()$ to

C%() all of length E%, set with the initial conditions. Each element holds one digit. This fourfold trade-off is faster as I presume they are C routines. Using parameters (3,1) and (1,1) and setting $a_n = 6$, gave me my "fudged", iterative method, which I coded as PROCContFrac as:

```
DEF PROCContFrac(over%,under%)
A%()=0: B%()=0
A%(0)=over%: B%(0)=under%
N%=6: SIZE=1
REPEAT
C%()=N%*A%(): C%()=C%()+B%()
PROCcarries
B%()=A%(): A%()=C%()
N%+=4: SIZE+=LOG(N%)
UNTIL SIZE>E%
ENDPROC
```

PROCcarries and FNmin would have been faster in assembler, but in Basic they are:

```
DEF PROCcarries
FOR I%=0 TO FNmin(E%-1,SIZE)
C%(I%+1)+=(C%(I%) DIV 10)
C%(I%)=C%(I%) MOD 10
NEXT
ENDPROC
DEF PROCmin(a,b)
IF a<b THEN =a ELSE =b
```

The remainder of the program can be coded to your own purposes. To be more general, N% needs to be replaced by an a array (remember π 's quotients).

Conclusion

Continued fractions are a fascinating subject in themselves. I hope I have given an insight into their power. By using Basic V array routines, I found a solution to a problem I had long wanted to solve. How I made a vulgar fraction a decimal one is another story. A

PenDown Fonts Disc

Dave Morrell

Some time ago I reviewed PenDown (3.13 p48 + 4.1 p42 + 4.6 p54). In that review I expressed the hope that Longman Logotron would support the Archimedes version of PenDown in the way that they supported the original PenDown with extra fonts and borders etc. They seem to have started their support with a disc of twelve fonts. All these fonts are what I would call fancy headline or poster fonts but in certain circumstances they could be used as body fonts.

ACUTE is a similar font to 'Shiver' which came with Poster. There are 208 defined characters in the font and they seem to be the same characters as Acorn's Trinity. 158 of the characters contain scaffold lines.

BRIX is a similar font to Jumbo which came out with PenDown but most of the characters are placed on a cube much like children's play bricks. The characters which are not on a cube are made to appear as if they are made out of a fairly thick piece of material. Again, the same 208 characters are defined, 191 of which have scaffold lines.

DIGITAL, as the name implies, looks like the letters and numbers associated with a digital display. It is a clear font and much easier to read than other attempts I have seen of this style. The standard 208 character set has been defined, 136 of which contain scaffold lines.

DRIFT is my own favourite from this set of fonts. It is in the same vein as the 'Snowball' font in Poster. There are 209 defined characters of which 156 contain scaffold lines. Some of the characters have been defined as small pictures making a short 'Christmas Dingbats' set. The characters not defined as pictures all have a vaguely horizontal line running through them. When printed out, this line joins up to look like the top of a snowdrift from which the snow covered letters appear. Even the space character has this line.

HORIZON is built up from horizontal lines. When printed out it looks as if every other pin of a dot-matrix printer is not working. It is a very clear font and is easy to read. It is similar to one which appeared for the original PenDown. There are 208 defined characters, of which 200 contain scaffold lines.

PenDown Fonts

KOSMO is another ultra-modern font. It is a slightly oblique, very square font with extra thickening of some lines. This is another 209 characters set of which 139 contain scaffold lines.

LINEOUT seems to be the outline font which appeared with the pre-release version of Archimedes PenDown but not the final release. Again it is a clear, easy to read font with 209 characters, 180 of which contain scaffold lines.

QUAD is a rather square script-type font similar in some respects to Kosmo. There are 208 defined characters of which 157 contain scaffold lines.

RAZOR is another font I particularly liked but it is difficult to describe. It is a blocky font in which all the edges appear to have been ground down and sharpened, hence the name. Like BRIX, it gives a 3-D effect. Razor has 208 defined characters of which 180 contain scaffold lines.

The final three fonts are, I think, pure gimmick. They are BRAILLE, MORSE and SEMAPHORE. I rather liked Semaphore which has all the letters of the alphabet defined plus one other. There are no scaffold lines and the only difference between upper and lower case is the addition of the letter on the figure in the upper case version. Upper case Braille and Morse also have the letter on show.

The small characters in the Semaphore font will brighten up anybody's

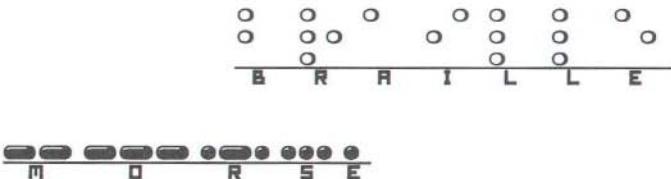
presentation and could even be utilised as a border.

The facts about scaffold lines came from FontFix.

From what I can tell by eye, both on screen and on paper, the fonts seem to be well hinted.

PenDown fonts disc is available from Longman Logotron at £18 + VAT or through Archive at £19 inclusive. This is very good value even if you only like two or three of the fonts and don't forget, these fonts are not just for use in PenDown - they can be used with any of the applications that can deal with outline fonts. A

*This is ACUTE font for PenDown
And this is Brix
Digital font is for projects
Open up a new Horizon
Drift is too cold for love
Kosmo is for robots
LineOut is for outlines
Quad is for squares
Razor for the sharp ones*



ARCterm7 – and Pilling Terminals

Brian Cowan

In the time I have been an Archimedes owner I must have tried every terminal emulator produced for that machine, including the old BBC terminal emulators together with 6502 emulation. Mostly, I use such terminals for communication, at work, with our DEC VAX "mainframe" computers, though occasionally I use my modem to log on to various bulletin boards. I had seen, and briefly used, ARCterm 6 and I was quite impressed with it. The problem, as with all the older generation of terminal emulators, was that they did not run in a window; in fact, many of them were originally written pre-RISC-OS.

Multi-tasking

It was only a matter of time until multi-tasking terminal emulators appeared. I was very impressed when I first saw Acorn's Ethernet software, as this included a multi-tasking VT220 terminal. Subsequently, other packages came along. Although I have probably seen and briefly tried all the terminal emulators around, I will not discuss most in detail but concentrate on two. There have already been reviews of the others in Archive. The first subject of the review, ARCterm7, I would describe as the best terminal emulator and the other, David Pilling's terminal suite, is certainly the cheapest and, to my mind, the best value for money.

Both packages are fully RISC-OS compatible, installing themselves on the icon bar and opening up a window when clicked on. The bare essential which one would require from a terminal emulator is that it should provide emulation of a computer terminal – obviously! As I mentioned above, my particular application is in communicating with DEC VAX mainframe computers. Here the DEC VT standard is what emulators are aiming at. Both terminal emulators give a good implementation of the VT100 standard. David Pilling's terminal also provides a subset of the VT220 standard as well. I should note in passing that the Acorn Ethernet TCP/IP software pack-

age includes an essentially complete implementation of VT220, which supports communication down the RS423 port as well as the main objective of Ethernet.

Compatibility

There are a number of standard tests which can be run to test full VT compatibility. None of the terminal emulators passed completely, misinterpreting the odd control code, but then all non-DEC terminals fall down on something or other. However, the number of misinterpreted codes was small. The latest version of David Pilling's VT100 terminal is near-perfect, as is ARCterm7.

Features

Taking full implementation of the emulated terminal for granted, what distinguishes the various packages around is the range of "extras" supported. Here, the list of ARCterm7's features is almost endless. A full collection of modem drivers is provided and there is implementation of many file transfer protocols including X, Y, Z and Jmodem and my favourite, Kermit. A powerful feature of ARCterm7 is its script language. In structure this is a sort of cross between C and Basic, and it allows the user to customise the program to his/her precise requirements. A script file can be "dropped" on the terminal window and its contents will be executed. Scripts are provided for logging on to various of the bulletin boards, including The World of Cryton. It works beautifully and painlessly. Another feature is that the Intelligent Interfaces multiple serial port is supported; one can select which port is used.

Hidden extras

ARCterm7 is still being improved. So far, I have received three upgrades since the original release 1.00. New features have appeared which are not covered in the manual (they are covered in a readme file on the disc though) including additions to the script language. I was very happy to find that there is now the option to open up a "history" window which contains a copy of the last 256 lines of the session and which can be

scrolled up and down. This I found most useful. Eventually I discovered that sections of this may be selected and saved as a file or copied, perhaps to an Edit window. The odd thing about this was that to "select" one had to use the "adjust" button of the mouse. There turns out to be a certain internally consistent logic to this as ARCterm7 often uses <adjust> for "select" functions.

It is equally easy to transmit files using ARCterm7. Files can either be sent directly or they can be queued for later transmission.

Documentation

The ARCterm manual is quite comprehensive, with a large section covering the details of the script language. You only need to use the manual when difficulties arise, which is not very often. It is well laid out and there is a good index. Also there is an extensive collection of appendices covering such diverse topics as choosing a modem, RS423 connections (potentially problematic with the Archimedes), and adding sound to ARCterm7.

Complaints

Complaints are few and relatively minor. The cursor is a caret rather than the usual DEC block. Most other terminal emulators allow a choice. Also, with ARCterm7 there is no smooth scrolling mode; the screen moves up a line at a time. Finally, the full ARCterm7 window is slightly larger than a standard monitor screen so you can't see everything together. Essentially, the text window fills the screen so that the scroll bars etc. fall outside.

I mention these three problems particularly because David Pilling's VT terminal emulator does not suffer from them. You can select the form of cursor you require: a block or a flashing block perhaps, and there is the option for a smoothly moving scroll. This I find much easier on the eyes, particularly when scanning a long document. A clever idea in the Pilling terminal is a slightly shrunken screen option whereby the whole emulator window can be viewed on the screen.

Pilling terminals

Most of the David Pilling software is sold at the

bargain price of £5.99 per disc as was the original version of his RISC-OS terminals. There is now a new version known as RISC-OS Terminals Plus with enhanced features, selling at the still attractive price of £17.99. The new version comes with a 40 page manual and it has a number of useful enhancements. There are now some commands to control the modem from the computer, and there is enhanced printer support: as well as straight ASCII, one can configure the terminal to use Epson LQ or IBM X24 codes. The main enhancement, however, is in the file transfer protocols. The original terminals provided for only Xmodem and pure ASCII – Terminals Plus adds Kermit and Zmodem.

Comparison

These are all first rate products. Pilling's terminals also has a script language for configuring the terminals automatically. This is good but nowhere near as comprehensive and versatile as ARCterm7's script language. The main important features which ARCterm7 provide and Pilling's terminals do not are the history window and the extensive range of modem drivers. It is interesting that Pilling's terminals are written directly in ARM code making them very compact and fast while ARCterm7 is mainly in C, using ARM code for the speed critical parts.

Conclusion

My conclusion is that David Pilling's original terminal emulator suite is excellent value for money at the remarkable price of £5.99. The new improved version, at £17.99, provides some extra features which might well be desirable (you can upgrade from one to the other for £17.99). If you need a terminal emulator and you don't yet have one then I would advise you to purchase the cheaper Pilling terminals to start with. If you then decide that there are other features which you would like, then you can decide whether to upgrade to Terminals+ or purchase ARCterm7. Certainly ARCterm7 has the most features and it is a joy to use. It is quite simply the best, but then at £79.99 you would expect it to be. A

Audio Data Compression

Ned Abell

When you next sit down and listen to your favourite CD, spare a thought for all the little electrons beavering away to make it possible. They really are raising a lather as the audio data is fed off the disc at 44.1 thousand times a second at 16 bits for the two channels – that's around 1.4 Megabits per second.

Put another way, a 20 Mbyte hard disc could store only about half a Top Ten single. Some would say that was a good thing! There is also the problem of reading and writing that speed of data to storage – hard discs can cope but floppies are too slow to work in real time.

Research Departments in many companies have been working overtime to squeeze the audio "quart" into a pint pot thus allowing smaller capture and carrying media or longer recording times. However, if you reduce the sample rate too much, or the number of sampled bits per second, it sounds very poor.

Spotting the difference

Audio Processing Technology (APT) was formed in 1988 by students at Belfast University who were working on digital telephone systems. Their approach to the problem is now coming on to the market through their parent company Solid State Logic.

What Steven Smyth and his colleagues have done is to compress the 16 bit sample to 4 by splitting the audio frequency into bands. The encoder then uses predictions based on samples of the audio that's gone through. The differences between the 16bit input and the predictions are turned into a 4 bit code and that's what is saved.

For example, a note could have a fast attack time, then a period of sustain and then a long period of decay. The changes in the note would be minimal whilst it was sustained and greatest during its attack. These differences take up a lot less room than writing essentially the same sequence of data each 44 thousandth of a second.

..and in practice.

There has been a lot of work done on these coding techniques and the result is impressive. It's not only the data that is predicted but also what the brain makes of it. For example, some sounds are judged critically by the ear because of their smoothness but others, which are sharp, can be received less favourably. Thus, the coding changes are more critical at times when the ear expects it!

The coding software drives processor chips and APT sells the resulting encoder and decoder boards as units to manufacturers and a range of products is starting to emerge

Products

Several manufacturers have seen the promise in this type of technology, for example in radio broadcast studios, jingles and adverts have often been played in using endless loop quarter inch magnetic tape cartridges with stop and start pulses on them. These are plugged into a player as they are wanted. They are prone to wear and sometimes don't cue up or cycle properly mostly due to "finger trouble". Soniflex now use 4 Megabyte floppy discs and apt-x 100 coding to store the audio so the operator feels he is using a familiar system, plugging in discs but the audio quality is better and access quicker – and finger trouble is reduced.

Digital Audio Broadcasting is being broadcast experimentally now in Britain and coding techniques like apt-x to reduce bit rates will be used. For example, linking television Outside Broadcast vehicles to base involves microwave transmission for the vision circuits and apt-x is being used to code the stereo sound into the vision circuits to reduce cost in a new "sound-in-syncs" decoder and encoder from Vistek.

For the IBM, there is an expansion card called the ACE100 that allows you real time direct-to-disc stereo recording and playback with analog or digital input/output. Data can be stored as

normal 16 bit or 4 bit apt at a range of sampling frequencies between 16 and 48kHz. You can store over 30 minutes of stereo music on a 60Mbyte drive. You can access the software on the board to program fades and emphasis and up to four boards can be linked which would give an 8 track hard disc recorder.

and the Archimedes...?

Well there isn't a specific apt-x board for the computer yet but I'm not ruling out the prospect given demand. Ironically, it will be determined by other manufacturers selling multi-media equipment, raising its profile and Archimedes suppliers following suit. I think the market is there

but then I'm not investing cash in the research. As Digital Audio Tape gains ground and when Digital Compact Cassette is launched, "home computer" editors will mushroom. The Archimedes' speed coupled with an APT board and some windowing editing software could be of great use.

The bottom line is a suitable data compression system for audio *and* video. Invent that and you have a blank cheque!

Audio Processing Technology Ltd. Begbroke, Oxford OX5 1RU are currently moving to Belfast on 0232-662714 and publish a newsletter detailing APT products. **A**

ArcLight and SolidsRender Ray-tracers

Malcolm Banthorpe

Ray-tracing can be broadly described as a method of generating computer graphic images which exhibit the maximum degree of realism that can be achieved within the limits imposed by the display hardware. To do this, it is necessary to take into account, as far as is practicable, all of the possible paths that each ray of light can take from each light source to the viewpoint. For a fuller explanation of what it's all about, see my review of another ray-tracing program, RenderBender, in Archive 2.9. Jim Markland has already written about his experience of ray-tracing with ArcLight for a specific application, namely the representation of geological data, in Archive 4.4. This review takes a more general look at both ArcLight and SolidsRender.

Unlike RenderBender, which is intended to be used as a stand-alone application and therefore contains everything necessary to construct simple scenes, both of the applications reviewed here are designed as accessories to be used with existing 3D graphics editors. This review will therefore make most sense to those who already have experience of either Euclid or SolidCAD and who wish to generate more realistic-looking images of scenes or of individual objects. It may also be of interest if you are contemplating the

purchase of such a rendering system, particularly if read in conjunction with reviews of the 3D editors which have appeared elsewhere. Both 3D editors already allow lighting to be represented to a limited degree by showing the effect of shading on the various facets of an object's surface. With ray-tracing, it is also possible to include shadows (a factor which alone contributes quite a lot to the realism), transparency, reflection and refraction. In order to achieve some degree of smooth shading from the 256 colour palette, both applications, like RenderBender, make use of dithering.

ArcLight, from Ace Computing, is the latest addition to the Euclid family and is specifically designed for the ray-tracing of scenes created with the !Euclid 3D editor. If you also have !Mogul then ray-traced animations can be produced which in turn can be edited with !Splice. SolidsRender, from Silicon Vision, works in conjunction with SolidCAD and it, too, can produce animations if you also have Film-Maker. The application comes with a built-in sphere-generating primitive and also included on the disc are files for a number of other primitives such as cubes, cylinders and cones. Limited stand-alone use is therefore possible and is the manner in which this review was conducted,

making use also of the sample scene files on the disc.

SolidsRender

SolidsRender is supplied on a single unprotected disc and comes with a 30-page instruction booklet. The program is not multi-tasking but is, I think, what Acorn would call RISC-OS compatible. That is, it installs itself on the icon bar when first run but when subsequently selected does not make use of the WIMP system. The Quit option return to the desktop as it was previously set. The operating environment is very similar to that of SolidCAD and indeed the instruction booklet assumes that the user is already familiar with it.

The screen is divided into four viewports showing plan, front and side elevations for design and a projection port for the 3D display. All of the views are wire-frame at this stage. At the right of the screen there is a menu selection area, while help and status messages are shown, and data entry takes place, at the foot of the screen. As mentioned earlier, the scene, or at least its component parts, would normally be generated using SolidCAD, although with the primitives provided, it is possible to construct a simple scene with SolidsRender alone.

Very comprehensive facilities are provided for setting the surface characteristics of each object in terms of colour, specular and diffuse reflection, transparency, refraction etc. This includes texture-mapping whereby a sprite or bit-map may be mapped onto a surface. This could be used, for example, to give a surface the appearance of wood grain. A bit-map is a two-level (that is, one bit per pixel) sprite. Each of the two levels may be assigned different characteristics. So, for instance, an object could have a patterned surface in which one part was metallic gold and the other was transparent to blue light. What's more, there are three different types of texture mapping to choose from: surface, shrink and project. If you choose the shrink option, then the texture file is wrapped around the object in both X and Y directions whereas shrink sets the texture to wrap in the X direction but to be

projected directly onto the surface in the Y direction. The project option sets the texture to be directly projected in both directions. Obviously, there's a vast number of possibilities for defining surface textures and some experimentation is required to find out how best to exploit this feature.

There are more options to choose from when it comes to the style menu. Mode 15, 24, 28 or 21 may be chosen for the final image. Fortunately, an image size as small as 1/8 screen may be chosen for the image size if you are in a hurry to get some idea of what it will look like. Texture, shadows, reflection, transmission and refraction may all be either on or off, as may soft-focus and anti-aliasing. The dithering copes quite well with representing subtle shading but I found the overall image quality to be disappointing. The edges of objects were generally ragged in appearance. I assume that the reason for this is that arithmetic precision has been sacrificed to achieve speed in the ray-tracing process. The overall appearance is changed but not really improved by selecting the anti-alias option which smoothes the edges to some extent at the expense of making everything look slightly blurred - similar to the soft focus option but less so.

ArcLight

ArcLight is supplied on a single unprotected disc and comes with a 14 page instruction leaflet. To ray-trace a picture, the following procedure is followed, once ArcLight has been installed on the icon bar. On dragging a previously prepared Euclid file onto the icon, a 'choices' dialogue box pops up and, assuming for the moment that you are happy with the default settings, ray-tracing can be initiated by entering a filename with which the resulting picture will be saved and dragging it to a suitable directory viewer. There will then be a wait of possibly a few seconds or maybe an hour or more, depending on the size of the sprite to be generated and the complexity of the scene, until the picture is complete. As the program is fully multi-tasking, it is possible to get on with some other computing activity, e.g. word-processing, while this is

happening as long as the other activity is also multi-tasking. An occasional glance at the ArcLight sprite window will show how it is progressing. Performing another task at the same time will necessarily slow down the ray-tracing process to a greater or lesser degree depending on the extent to which your extra task demands processor time, but at least the computer is still usable while you wait for the final result. For maximum rendering speed there is a 'fast' option which allows ArcLight to claim exclusive use of the processor. The display is also disabled in this mode, but can be re-enabled instantly by clicking a mouse button if you should wish to check on the progress of the image.

In order to speed up the ray-tracing process, ArcLight uses a spacial sub-division algorithm. Briefly, the way it works is as follows. Imagine a box just large enough to contain the whole three-dimensional scene. If there are too many polygons in the scene to be dealt with simply, it is sub-divided into eight smaller boxes called voxels – a sort of three-dimensional pixel. Each voxel is then examined and if it still proves to be too complex, it is further sub-divided. The subdivision can continue to a maximum value, settable from the choices menu and known as 'depth'. A voxel is considered to be too complex if the number of polygons that it contains exceeds a certain value, also settable from the choices menu, known as 'simplicity'. Some trial and error is required to find the best setting to achieve optimum use of available memory and speed, and I found it best, most of the time, to stick to the default values of six and one respectively.

A number of other parameters can be set from the choices menu. Perhaps the most important are the image size and the screen mode in which the final picture is to be generated. For the dithering to work, this must be a 256-colour mode. User-defined screen modes for over-scanned images also seem to work OK as long as they are eight-bits-per-pixel. The desktop mode in use during the rendering can be set independently

without restrictions – mode 0 for maximum speed. The final image size may be larger than the screen if required. There may seem little point in doing this, particularly as it's going to take longer. The advantage is that a large image may subsequently be reduced by a program such as ChangeFSI, resulting true anti-aliasing and an improvement in those jagged edges imposed by the 256 lines of vertical resolution on a non-multisync monitor.

Arclight showed occasional evidence of the limits of its arithmetic precision in the form of ragged edges but in general I found this to be considerably less noticeable than with Solids-Render. The problem showed itself mainly as single pixel pinhole gaps at the common edges of adjacent polygons and occurred sufficiently rarely that the image could be tidied up fairly quickly using !Paint.

A number of surface types, such as wood, metal, mirror, glass can already be selected within the Euclid 3D editor. User defined materials are also possible but, like Jim Markland, I was unable to get this option to work properly and never reached a definite conclusion as to whether it was me or the software that was doing something wrong.

Conclusions

It would be inappropriate to recommend one of these ray-tracers as being better than the other as they are aimed almost exclusively at two different groups of users who already use their parent products. Both are reasonably fast. I got the impression that Arclight had the edge for speed particularly for complex scenes but was unable to compare them using a similar source file. A comparison using a very simple scene – a cube – on both showed only a small difference. Solids-Render has the major advantage of texture mapping although, for me, this was negated by the overall image quality.

Ray-tracing certainly adds an extra degree of realism to 3D images but it is arguable whether the term "photo-realistic" can be truly applied to the Archimedes until someone produces a 24-bit graphics add-on (or possibly the necessary hard-

ware will be included in a future incarnation of the machine) to enable the full range of colours to be achieved without the sacrifice of spatial resolution which is inherent in dithering. Nevertheless,

the results from both of these ray-tracers do considerably enhance the images obtained from their respective parent 3D editors. A

Fine Racer

Geoff Scott

There may be some who remember Jet Boat for the BBC in which you guided a fast jet boat around a multi-directional scrolling river network within a certain time limit whilst avoiding barriers, abandoned logs, boats and other various scattered objects. Well, Fine Racer is a BBC equivalent. It is a fast and challenging game from Eterna in which you have to guide a rally buggy around a multi-directional scrolling landscape littered with roadworks, credits, barriers, trees, walls, etc.

I'm not sure what that is saying, but just as I was addicted to Jet Boat so I have become addicted to Fine Racer.

The game is, sadly, protected in a way which prevents hard disc installation and personal backups. Also, like many of the early Archimedes games, it reconfigures the machine, making return to the desktop impossible.

On booting the game you are presented with a screen depicting a garage. It is here you are given the chance to equip your buggy with all of the latest features, but to buy these you will need credits.

Starting the actual game, you are one of four racers, each out-to cause as much trouble as possible to the others whilst aiming to collect eight 'checks', and then to win the race. Simple? No. To add to your problems you have to worry about the state of your buggy. The engine and the tyres are damaged with each collision and, to make matters worse, I found that the lack of brakes could not be compensated for completely by careful use of the accelerator. This means that you are likely to shoot off into a wall which is detrimental to the car, leading eventually to its destruction.

There are many different tracks, each of which is quite large, making it a struggle to survive one track in a good enough condition to even consider beginning the next. Luckily there is the provision of a training mode, in which a track is picked at random and you are given unlimited time to explore it without having to worry about the other cars – unfortunately, the checks and the other bonuses are also hidden.

There is also a third mode of racing which is called the labyrinth race. The idea is to build up extra credits before trusting your car to the main race, or simply to gain some driving practice.

The time limit which is imposed on you is effectively set by the third car to get completely around the track. This is because, if you end up in fourth position, you have to turn around and race back to the start, but it's not that simple because another car homes in on you to cause your eventual destruction – a car belonging to the tyrant Mad Max!

Your car is one of the latest in buggy technology(!) – upgrades may be added which add a welcome boost to the car, and you do not have to remain defenceless against the wrath of the others as you can buy, for a mere 50 credits, a bomb which will halt them for a while. From the garage you can also buy accessories which will make the catching ability of your car increase, a return to the race option, a more or less sensitive steering system and also the option of which mode to play in. This is also where you are given the most welcome options – repairs.

I thoroughly enjoy playing this game. The graphics are good and the sound is excellent. It is well worth the money – £19.95 from Vector Services or £18 through Archive. A

Viewpoints

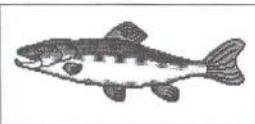
Paul Welbank

Viewpoints is an appealing little application which could be used in a variety of contexts within the primary and secondary school curriculum. Its chief attraction is the high quality of the countryside 'views' and the collection of over fifty colourful and realistic sprites of British wildlife. These are in normal sprite format, so could be extracted and used elsewhere, for example in DTP.

The program comes on three discs; the 'Startup' disc is uncopyable, in true Sherston style, while the Exploration and Database discs can be backed up. It demonstrated an irritating sensitivity to machine environment; it would not run on any of our networked Archimedes, nor on my own machine with a hard-disc, without reconfiguring the default filing systems; not very friendly! The introductory sequence of flashing screens of various grey/brown hues is somewhat disconcerting and amateurish, but eventually progresses to some attractive countryside graphics.

Using the Exploration disc; the idea is for pupils to explore the map provided, seeking likely habitats for discovering an assortment of British wildlife species. If they come across a likely area, pupils can 'watch and wait' or 'look closely' at selected regions of the displayed view. At this point, a species will undoubtedly appear and the explorer has the opportunity to 'photograph' the animal using the mouse buttons and a frame which appears. This is quite nicely done because, if you are not quick enough, you will as likely as not chop off the animal's head or snap its disappearing back-side. Quite realistic really; and fun. You can discard unsatisfactory snaps and try again. Eventually, sets of snaps must be saved to disc or deposited in the database.

The exploratory side of the game can be approached in different ways. A class can be asked to find as many species as they can in a given time or they can work on a points basis, with more points given for rare species. All of this will require them to interpret the map. There is also a built-in 'treasure trail' where pupils follow clues to find the golden statue. Just the job for the last week of term! All the alternatives are well documented in the manual and selectable on the 'Teacher Control' menu, so that the tasks can be made simple or complex according to the age/ability of the pupils. I was not able to test Viewpoints with a class as this would have required running off 32 disc copies. We look forward to the Econet version appearing.



The Viewpoints 'Database' disc contains a database system which can be used alongside the exploratory activities mentioned above, or indeed independently as a simple database comprising text, numeric or picture fields. In conjunction with the exploration, pupils can use the supplied database format or create their own. As animals are photographed, the pictures can be transferred into the database and the textual fields can be filled in from the supplied information cards. The font used is large, so you cannot expect to put large quantities of data in a record. However, the inclusion of the picture sprites gives an attractive introduction to database work, with primitive searching sorting and graphing facilities available.

The Teachers' Book is well presented and has extensive sections on relevant subject-specific connections, suggestions for further activities, National Curriculum Attainment Targets and useful addresses of organisations and associations. All in all, a well presented, useful and reasonably priced package - £35 +VAT from Sherston Software. **A**



Key Plus

Joe Gallagher

Key, from ITV Software, appeared on the scene three years ago. It aroused much interest at the time, not only because of the wealth of facilities it offered in comparison to existing database packages for schools, but also due to the fact that it was offered at the giveaway price of £5. ITV's intention was that the data handling package itself should act as a loss leader to enable it penetrate a fairly crowded market. The datafiles accompanying the package (which tended to be priced at a more realistic level) were not long in arriving and today, Key can boast a range of support materials comparable with those of its rivals of lengthier pedigree.

Another novel feature of Key was that, although it was designed to be able to be used among the widest age range of children, the facilities that it offered in respect of data handling, statistics and graphs, far outstripped those of its rivals.

My one major reservation about the BBC version of Key concerned the complexity of its menu structure. To carry out even the simplest of tasks involved traversing a series of menus and submenus and, after using them for a while with children, I began to appreciate, for once, the spartan beauty of an old fashioned command driven approach as typified by Quest. I was intrigued to see whether the RISC-OS version of Key would address these issues.

RISC-OS Key

Key Plus, the Archimedes version, is supplied with two sample datafiles and consists of two applications, Key Plus and Key Edit. Key Edit is used for creating new datafiles and Key Plus is the main information retrieval program. In fact, two versions of Key are supplied on the disc. As well as the main RISC-OS version there is a version which runs in full screen mode and provides a good emulation of the original BBC program, though heaven knows why anyone should want it. Communicating with other programs, in terms of output, is very easy, thanks to

Key's use of the RISC-OS data transfer facilities but the program is rather limited in terms of files which it will accept. There is an accompanying conversion program but it only works with datafiles produced by earlier versions of Key.

Loading datafiles

In a way which is reminiscent of Impression, Key's datafiles consist of directories containing a set of related files such as indexes or forms. However, unlike Impression, the datafiles are not application style directories and therefore cannot be loaded by double-clicking on the icon. Instead they must be dragged on to the Key Plus icon on the icon bar. This opens a small window displaying several useful items of information about the current file including the number of fields and records in the database and also the date when the file was last updated. Clicking on the menu button brings up a list of search, sort and display options.

Easy to use

Key Plus is basically RISC-OS compliant although the memory that it requires severely limits its multi-tasking abilities on a 1Mbyte machine. Even if you have more memory, you are still only allowed to open one datafile at a time. Selecting the fields for display is extremely easy using the Archimedes' walking menus, and browsing through records is achieved by clicking on video type buttons with a fast forward/rewind option to increase the step rate from one to ten records at a time. This gadget, however, does tend to disappear when a number of windows are on screen and hunting for it can be an infuriating process. A keyboard shortcut to retrieve it to the front of the screen would be a most welcome addition and save a lot of window re-arranging.

New features

The original BBC Key was quite a trend setter in its use of maps and graphics. This inception of the program is no less innovative. You can load a map file and select records of places simply by drawing a rectangle around their locations with

Key Plus

the mouse and clicking. Key can also control an interactive video disc player if you have a gen-lock board fitted. Possibly with 1992 in mind, Key has been designed to run in a variety of languages.

Index files

A lot of thought has gone into the display of information. The user is able to design his or her own forms for displaying and printing data, including an option for tabular display. I'm not sure if this feature is fully implemented as it seemed very easy to make a dog's dinner of the whole process. Unusually for a dedicated educational information retrieval program, Key Plus can handle index files. When you have carried out a search or a sort, you can save the criteria as an index file for future reference. This can be re-used by dragging the index file on to the appropriate menu and away you go. This feature, which is a joy to use, is also available for user defined card formats.

Graphs

The graphing and statistical facilities are very comprehensive and are easily accessed from the initial menu. These have a particularly nice feature whereby graphs and charts are automatically rescaled when the window is resized so that the whole graph remains in view. Graphs can only be exported as sprite files at the moment although future enhancements of the program will include the ability to export them as drawfiles.

Editing

New files are created by clicking on the create option on the Key Edit icon on the menu bar and existing files are edited by dragging their folder on to the same icon. You are offered three alternatives: to edit data, structure or graphics. Unfortunately, you can only choose one of these options per editing session and if you decide, after changing the structure of the file, that you wish to edit the data, you need to close down the datafile and reopen it again.

Datatypes

The program caters for an impressive range of data types. As well as the more usual string and numeric handling facilities, the user can set up a

datafile which includes date, formula, graphic, map coordinate, video and, most surprising of all, relational fields. In addition, token and nominal fields with predefined (multiple choice type) categories can be constructed. Because the data in this type of field is held in much the same way that tokenized Basic keywords are stored, it can represent a much larger amount of information in the final output of a file. This feature not only reduces the amount of disc space required but also lessens the likelihood of data entry errors. The down side of this plethora of field types is that it presupposes a certain level of sophistication on the part of the user. The manual (which in its present form does not have an index) does give clear and concise explanations of each field type. However, you can only subsequently alter the structure of the datafile with respect to field lengths and not field types. One very useful new feature is that numeric fields have a "data unknown" option, which is automatically excluded from all calculations. Data can also be entered into these fields as units of measurement yet still have all mathematical operations carried out on them.

Speed

My biggest criticism of Key is its speed. Editing a large file is rather slow as the program seemed to need to access the disc very frequently. It is possible to allocate a section of memory as a data cache, in much the same way that font caches are used in Desktop Publishing. Unfortunately, the size of this is not alterable on the fly as one needs to change the configuration file for Key. It would be much easier to be able to set these parameters from a preferences option on the Key icon or from within the program.

One other niggle concerns its apparent inability to search for a blank field. For example in the supplied file, Pakfield 1851, I tried unsuccessfully to see what sort of people had no form of occupation listed against their name but was unsuccessful even though browsing through the records revealed that there were many that matched this condition. Does the government use Key to compile its unemployment figures?

Conclusions

I think that Key Plus could be very attractive to the generalist user, especially if they already happen to be acquainted with RISC-OS. I'm usually all in favour of discarding the manual and experimenting with a program but I found myself dipping into it more frequently than I care to admit. While it's nice to see an educational package which is so fully featured, it's just possible that a novice user could become overwhelmed by all the easy to access options and spend a long time going down interesting but rather blind alleys. For instance, it's possible, in no time at all, to find your screen covered by myriad windows. Having said that, there is no doubt that it is a marked improvement on the labyrinth of menus and sub-menus that characterized the BBC version.

Whilst I wouldn't like to say that Key represents the final word in school databases, it is certainly a step in the direction that other (commercial) databases, such as Superbase running under Windows 3, are going. ITV have an ongoing policy of improving the program in response to

feedback from users and this should help knock off some of the rough edges of the program. I look forward to seeing the promised junior version as well as the related KeyCalc spreadsheet.

Prices

ITV have adopted a very flexible pricing policy which takes account of the pocket of the purchaser. The price of site licence ranges from £60 for a small primary school to £150 for a large secondary school with more than 800 pupils. Individual purchasers can buy a single copy for £50 plus VAT. These prices represent excellent value for money for a state of the art program positively bristling with powerful features.

Support is not built into the price of the package but is available for £15 per annum for three years. This also entitles you to regular program upgrades as they become available. I think that this is a not unreasonable way of enabling ITV to charge a very low entry price while leaving the option open for schools to invest an extra few pounds should they feel that the program warrants it. A

Control Programming with Arachnid

Peter Thomson

Arachnid is a real-time extension for the Archimedes computer for control systems. The reviewed system consisted of Termite – an interface box to plug into the user port (£132 +VAT) and Arachnid – a disc of software with a very comprehensive manual (£100 +VAT) both from Paul Fray Ltd.

Hardware

The interface box is the same 'Termite' as sold for the BBC-B. It plugs into the user port on any I/O board and brings the 8 data lines out to 16 sockets giving 8 input and 8 output lines. These are optically isolated both for input and output with a DC power supply supplied by the user. The input line will drive the same output line so that connections should not be made to both at

the same time. The board is well made, mounted in a plastic box.

A310 system

The Arachnid software has been developed to run on the A310 with Acorn I/O board or with Paul Fray's own interface boards. I ran it without any problems on an A3000 with the Morley user port but it would not run with the HCCS board. This could be because SWI "I/O_Podule_Hardware" (&40500) which can be used to report the base address of upgrade hardware is not given a return value by the HCCS board.

Programmers only

You have to be able to program in Basic in order to use this package. Arachnid software comes in two parts. A relocatable module that handles input and output from all the ports available to the

system and a large library of Basic procedures that help with programming the processing between input and output. These procedures are well written and extremely well documented. All those I tried functioned effectively. There is also a tutorial section that includes a number of simple programs to demonstrate how the system works but after that it is up to the programmer to create a working application using this system.

Mode of operation

The user sets up links between input and output by calling procedures from the software library using appropriate parameters and additional programming in Basic. The module code checks for any change of input every 0.01s. If it detects a change in input that has been identified as a link to output by the Basic program, it passes control to that procedure. The module program will continue to put such input events into a queue until the Basic procedure returns control. The Basic procedure is not interrupted. If there is a further event in the queue then the relevant procedure is called but if the queue is empty, the system waits for the next event. For this system to work it is essential that all procedures operate quickly without pause and then return control.

Evaluation

The author has developed his own jargon to describe the operation of control software. There is enough jargon about already and I found much of this unnecessary.

The software assumes a linear relationship between input and output with a particular input being linked to a specific output procedure. Many control applications which need computer supervision rather than dedicated logic are based on decision tables or a series of rules which may vary with time, being dependent on the past history of input and output as well as current events. This would require complex programming with Arachnid because it has been deliberately written as an event driven control system to avoid the need to set up this type of complex decision table.

Another section of industrial control programming is achieved by manually driving the system through the computer with the computer monitoring and recording the relationships of input and output. This file can then be edited before being used as the process control file. This would also be difficult to program with this software.

Arachnid has a fixed order of priorities for handling the input ports which cannot be changed. If a high priority event is using up all the processor time then a lower priority event may never be called.

Facilities already available

The experienced programmer already has a range of facilities for real time operation within the normal operating system.

OS_CallEvery (SWI &3C) will call a specified machine code program every time a delay elapses. The shortest time interval is 0.01s and this can be used to take measurements or monitor any input at regular intervals. The code that is called must push all registers on entry and pull them again on exit, with the exception of the stack pointer itself. The code must not use any non re-entrant SWI if running as a background task to a program in Basic. i.e. if a Basic program is producing text on screen display then the called code cannot use a SWI to read the analogue port or user port as both make use of SWI &06. It must read the port directly.

OS_CallAfter (SWI &3B) will call a machine code program after a single time delay. Again the shortest time is 0.01s.

OS_RemoveTickerEvent (SWI &3D) is used to remove a timed event from the list.

OS_ReadMonotonicTime (SWI &42) gives time in 0.01s intervals since the last hard reset. It can be used to replace all countdown clocks. To do this, add the current clock time to the required interval and then store it. Use OS_CallEvery to check any stored values for time intervals every 0.01s and report when the time interval is reached.

OS_GenerateEvent (SWI &22) can be used to generate interrupts from a wide range of events such as any output buffer empty or full, key pressed, ADC end conversion etc. The event also needs to be enabled with OS_Byt 14. This can also be used within the code called by OS_Call-Every to generate a user event.

Conclusion

Arachnid is an interesting package for those who

already know something of both programming and control. A competent programmer might not need it, and I would think that a novice would find it too difficult. The supporting documentation for the user is excellent but it does need a good index.

It is worth purchasing if you are developing event driven control applications. **A**

Conform

Diane Hobson

After a very long wait for any concept keyboard software for the Archimedes, typically, two packages are released together! Last month I reviewed Longman Logotron's Concept Designer and now I will review Conform and try to give a comparison at the end.

The package

Conform is available from Northwest Semerc for £15.00 +VAT. The package contains one disc, an A5 manual and four paper overlays in both A3 and A4 size.

The disc contains two applications, !Conform, the overlay designer, and !RunCK, the driver which enables an overlay to be used. Also, Jotter font is included, which is a font suitable for Primary School use and is the default font used by the program, and five example overlay files.

The disc is not copy protected and easily installs on a hard disc. Conform is not a 'Blue File' program like many from Northwest Semerc and therefore is *not* freely copyable.

The versions under review are !RunCK - 0.24 and !Conform - 1.24

The manual

The A5 manual is small and concise, reflecting the ease of use of the package. There is neither a contents page nor an index but there should be no difficulty in finding the information that you need.

!RunCK

When this is installed, overlay files can be loaded by double-clicking or dragging to the !RunCK icon (on the left hand side of the icon bar). Alternatively, just double click on the overlay file and !RunCK will load automatically (provided it has been seen). The amount of memory used is only 32k, so you should have enough memory available even on a 1M machine.

When an overlay is loaded, the icon on the icon bar changes and the name of the overlay is displayed underneath. The concept keyboard can then be used with any multi-tasking program and also can enter text or commands in Basic or at the command line.

If you wish to change overlays, just drag the new one to the icon bar or double click on it. This will then be the current overlay. Clicking <menu> over !RunCK produces just three options: Info, On/Off and Quit. On/Off allows you to switch concept keyboard input on and off. This does not, of course, switch off the power to the concept keyboard, just the ability to use it.

!Conform

!Conform is the overlay design program. It appears almost fully RISC-OS compliant as you can use other RISC-OS programs at the same time, but you cannot have more than one overlay file loaded at once. It requires 256k of memory.

The application loads onto the right hand side of the icon bar. The icon bar menu has three menu

Conform

options Info, Configure (to alter the default font and font size) and Quit.

Designing the layout

Clicking <select> over the icon opens a window that looks like a concept keyboard. You can now design the layout of your overlay by either choosing a ready defined grid from a menu option or set out your own. To define an area on the concept keyboard just drag with <select> over the cell(s) required. The chosen area will appear to be covered with a white square or rectangle. Once defined, the size of an area cannot be changed without first deleting the originally defined area. This is easily done by dragging with <adjust> in any part of the area. Then a new area can be defined as before.

Entering the messages

The messages are defined by double clicking on the white area required. This opens up a dialogue box into which you enter your text. The text you have entered will be shown on the white area nicely centred. If, however, there is not enough room for the text you have entered, a red border will appear and you will either have to edit the amount of text by re-opening the dialogue box or change the size of the font (a menu option (Style) is available for this). The Style option also allows you to choose any font you have loaded.

If you require to enter a special code such as <return> or <print>, you double click as before but when the dialogue box appears you click on the toggle size icon of this window and it will open up to reveal all the available control codes. Just click on the one required and press <return>. An area that has a code allocated to it will be shown with a light blue border.

The space bar is not included as a special key. This has to be defined in the text dialogue box with just a press of the space bar. When the overlay is printed, of course, this will just show as a blank space. One way of getting round this would be to define the area with the text "Space Bar", print it out and then edit the overlay afterwards.

Pictures

Sprites and Draw files can be shown on the overlay for printing but cannot be transferred to the screen via the concept keyboard, so you must remember to enter the text you wish the picture to represent. The Sprite or Draw files are just dragged onto the area and will be scaled to fit. Although the text is then entered in the normal way, it will not be shown on the overlay. The files can be dragged directly from any disc but should also be copied to the Sprite or Draw directories within the !Conform application so they can be found if the overlay is reloaded.

Saving

Once you have completed your overlay, you can save it by using the menu option Save, into which you can enter the path or simply drag the icon to the directory viewer. The overlays are given their own filetype (C83) and icon and can be renamed after saving without this being affected.

Printing

Your completed overlay can be printed out via the menu using the RISC-OS printer drivers. The overlay name will automatically be printed in the top right hand corner in the font used for the rest of the text. The printing does take a while, particularly if pictures are involved, but it is well worth it for the result.

Conclusion

!Conform is everything it claims to be – a no frills, easy-to-use overlay generator that I can thoroughly recommend.

The only small niggle I have is that, in the !Conform menu option "Style", the window cannot be moved around the screen making it rather awkward if the text you are altering is below it. (If you own a copy of FormEd you can easily rectify this.)

Conform v. Concept Designer

There are advantages and disadvantages with both packages, so I will try to be fair and not too negative.

Conform does have what I feel to be the biggest advantage and that is being able to print the

overlay. The concept keyboard can be used at the command line and in Basic.

The Concept Designer package is more sophisticated and contains more applications than Conform with !SoftTouch, the concept keyboard emulator and !TouchData, similar to Touch Explorer Plus on the BBC, which allows text and pictures to be explored on the screen. Different levels of overlays can be used and many more special commands can be entered. Different types of concept keyboards i.e. Serial or PC are catered for and keyboard delays can be altered.

Neither program seems to have thought about the space bar and, unfortunately, the files are not compatible with each other.

Your choice must depend on your needs. If you mainly require to use the concept keyboard for Word Processing, Conform is probably all you need. Even if you would make use of Concept Designers' extra facilities and programs, unless a print option is added, you may find, for only another £15, Conform would be worth buying too, just to print out the overlays. A

Freddy Teddy's Adventure

Diane Hobson

This is the latest Freddy Teddy release from Topologika priced at £19.95 +VAT (or £21 from Archive). It is described as a mouse and icon driven adventure game for the very young and the aims of the program are "to develop logical thinking, problem solving and decision making".

The package contains the disc, a Teacher's Booklet, a simple story book and a letter from Freddy Teddy.

The disc is not copy protected and you can make several backup copies, provided they are used on one site, and easily installs on a hard disc. The program may not be used on a network without full written permission.

Teachers booklet

The Teachers Booklet is concise and to the point, giving easy to follow instructions on how to set up and play the adventure without spoiling the fun by giving you the solution.

The adventure

Freddy Teddy wants to go on a picnic with his friends but, before he can, the child(ren) must help him collect some items he needs.

The program takes some time to load from floppy disc as all the voices and sprites are loaded into memory, but the child is given an opportunity to count backwards as this is happening.

You are first presented with a choice of the maximum numeral that will be used in the counting activities (2-10). Then you can set a time limit, Winter, Summer or no limit (Winter being the shortest, as are Winter days). You can then choose to use either the mouse or the keyboard. The settings chosen cannot be altered unless you quit and restart the program.

Now it's the children's turn to give Freddy Teddy some information and they will be asked "How many are in your group?" (maximum 5), then "How many girls?" and then "How many boys?"

The adventure begins on a path in a wood and you can see a sign. You are given the option of reading the sign. When you have chosen whether to read it or not you are presented with eight small pictures representing the scenes you can visit. The scenes have to be visited in a certain order to collect each clue/item and if you get stuck the Wise Owl will usually help. The child(ren) should be told to remember what they find and the numbers they count as these will be needed later.

If the scenes are successfully completed an invitation has to be filled in and this is when the details of the adventure need to be remembered. When the invitation is correctly completed there is a reward of an animated picnic scene to the

Freddy Teddy's Adventure

tune of Teddy Bears' Picnic. You are then given the opportunity to play again.

Pressing <escape> at any time during the adventure ends that attempt and asks if you would like another go. The adventure must be completed in one go as there is no facility to save when playing.

Conclusion

The graphics are superb and immediately appealing to young children. The overall idea is very good and beautifully presented. However, I cannot wholly recommend the program as I find the age range of the skills involved rather diverse. The puzzles seem to be suitable for 3 or 4 year olds but the memory, reading and sequencing skills are more suited to an older child. (No specific age is recommended in the documentation).

I do not feel that the program would appeal to one child for very long because the adventure is almost identical each time, so home use may be somewhat limited (I have to admit that perhaps a 3/4 year old might like the repetition, but my 5 year old has certainly lost interest after playing just three times and my 7 year old announced it was "boring" after just two, despite her first reaction being favourable.)

The program would be most useful in an early Infant School classroom where it would not be repeated by the same child(ren) many times. The adventure could be complimented by using the appealing sprites to illustrate written work (this flexibility of RISC-OS can make these graphical programs good value). A

KAS Software	74 Dovers Park, Bathford, Bath BA1 7UE. (0225-858464)
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Micro Studio Ltd	22 Churchgate Street, Soham, Ely, Cambridgeshire.
Northwest SEMERC	Fitton Hill CDC, Rosary Road, Oldham, OL8 2QE.
Oak Solutions (p19)	Cross Park House, Low Green, Rawdon, Leeds, LS19 6HA. (0532-502615) (-506868)
Paul Fray Ltd	4 Flint Lane, Ely Road, Waterbeach, Cambridge CB5 9QZ. (0223-441134) (-441017).
P.R.E.S.	6 Ava House, Chobham, Surrey. (0276-72046)
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The Serial Port	Burcott Manor, Wells, Somerset, BA5 1NH. (0243-531194) (-531196)
Topologika	P.O. Box 39, Stilton, Peterborough, PE7 3RL. (0733-244682)
Vector Services Ltd	13 Dennington Road, Wellingborough, Northants, NN8 2RL.

Fact-File

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are fax numbers)

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